IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Hisense USA Corporation

Petitioner

v.

Brightplus Ventures LLC

Patent Owner

Case IPR2023-01411

U.S. Patent No. 7,872,705

Ex. 2001 - Declaration of William Bohannon

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EXHIBIT LIST

Exhibit	Description
2001	Declaration of William K. Bohannon ("Bohannon Decl.")
2002	Curriculum vitae of William K. Bohannon
2003	Joint Claim Construction Statement
2004	Brightplus Ventures LLC's Opening Claim Construction Brief
2005	Hisense' Opening Claim Construction Brief

I, William K. Bohannon, hereby declare under penalty of perjury:

I. INTRODUCTION

1. I am an independent consultant. I am over eighteen years of age, and I would otherwise be competent to testify as to the matters set forth herein if I am called upon to do so.

2. I have prepared this Declaration for consideration by the Patent Trial and Appeal Board in the Inter Partes Reviews of U.S. Patent No. 7,872,705 ("the '705 Patent").

3. I provide this Declaration at the request of and have been retained by Ni, Wang & Massand, PLLC, which represents Patent Owner Brightplus Ventures LLC ("Brightplus" or "Patent Owner") in connection with the above-captioned Inter Partes Review.

4. I have been informed and understand that Petitioner Hisense USA Corporation ("Hisense" or "Petitioner") contends that claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31-34 of the '705 Patent are invalid based on Grounds 1-6.

5. I am being compensated at an hourly rate of $350 per hour. My compensation is not dependent on the outcome of or any issue in relation to the above-captioned Inter Partes Review, and I have no interest in either party.

6. In forming my opinions, I relied on my knowledge, education, experience, and training in the field and on documents and information referenced in this Declaration.

A. Expert Qualifications

7. My curriculum vitae ("CV") is attached hereto as Exhibit 2002 and provides an accurate identification of my background and experience.

8. I have over (30) years of commercial industrial electronics experience including experience in the areas of LCD, Plasma, CRT and Large Screen Display Equipment: LCD manufacturing, substrates, drivers and other related components for rear screen displays including Avionics and cockpit displays.

9. I studied Physics and Mathematics in college as shown in my CV. I learned electronics in my physics course work and obtained practical experience making my own telescope drive electronics and with amateur radio projects. After graduation I worked with Science Applications (1976) developing neutron spectroscopy methods and laboratory equipment including specialized software and electronics. A paper I wrote regarding this work and published by American Nuclear Society, ANS. [Bohannon, W.K., et al., Fast Program for Automatic Gamma-Ray Analysis, Transactions of the American Nuclear Society, May 1978.]

10. Thereafter, I continued my electronics work with radar systems for a small defense contractor as well as with Hughes Aircraft Company. My work with

Hughes Aircraft Company included work as the Systems Engineer responsible for all hardware and software used in part of a large laser weapon system. In that capacity, I was required to debug, diagnose and repair problems in the electronic sub-systems including digital, analog and power supply sub-systems used on board the test aircraft. After I left Hughes Aircraft, I worked with TRW where I was responsible for hardware (including analog, RF and digital systems) and software as well as computer architectures used in complex avionics systems.

11. My work with electronics continued when I became Chief Scientist for Computer Accessories in charge of the company's technology direction for consumer products. As I recall well, one of the largest changes involved with moving from military avionics to consumer electronics was in the power sources and power supplies. In particular, military electronics used in aviation depend upon the on-board aircraft's power bus whereas the consumer electronics produced by Computer Accessories depended on inexpensive flyback converters used to convert 120 volt 60 Hz AC line power to the low voltage DC needed to power the product's PCBs as well as on board PCB buck and boost converters (for example 5, 12 and 25 volt) needed by LCD based display products. One of my patents (U.S. Patent No. 5,089,810) filed in 1990 shows how a portion of this low voltage DC power is supplied and used. I have been granted several other patents related to LCD displays as shown in my CV. As part of my work with Computer Accessories, I searched for

new sources of power supplies for our products as well as for other types of electronic components.

12. Since 1994, I have been an independent consultant for Manx Research working on various display products including managing and conducting detailed technical product evaluations for all kinds of display products – LCD, CRT, Plasma and LED direct view, projection products of all types, CRT products and plasma products. Furthermore, I was also a design and procurement consultant to an aerospace display company involved in re-designing Avionic LCD cockpit display sub-systems to use full color R, G, B LED light sources instead of short arc lamps in a compact, rear-screen 3 panel projection system. As a part of my work with Manx Research, I studied all available power supply architectures including isolated, off-line flyback AC/DC converters as well as buck and boost DC-DC converters. I also helped my customers manage their power supply intellectual property by identifying potential infringers of their power supply patents.

13. Edge Semiconductor designed and manufactured specialized analog ICs used in automatic testing equipment (ATE) for testing of other ICs (either in packages or on wafers) in mass production. Edge Semiconductor produced drivers, comparators, clock distribution ICs and PMUs. A parametric measurement unit (PMU) is an extremely accurate power supply used for testing that can force and measure both current and voltage to a device under test (DUT). When I worked with

Edge Semiconductor, I initially helped to define their analog PMU design requirements as well as worked with ATE customers, such as Advantest in Japan, when they evaluated some of our initial PMU prototypes. Advantest's requirements included the ability for a PMU to supply DC power and to accurately measure I-V during various transient conditions. For example, when a microprocessor or memory chip is being tested, the various power-on and power-down modes must also be tested. Switching from a sleep mode to a power-on mode causes a large transient to the power supply. Edge Semiconductor had to revise their initial PMU designs many times before finally achieving customer acceptance. Each time a new version became available, I worked with the customers to re-evaluate those new designs and to help with their board design.

14. Planet ATE went a step further than Edge-Semtech and developed a more powerful (more than 1 amp) DUT power supply with I-V measurement ability in a programmable analog IC format. I introduced each of these new designs to all of my customers, worked with them to evaluate the design and to design the ICs into their systems. Each of these power supply ICs could be ganged together to supply multi-Amp power to any part under test, all while maintaining an accurate, real time measurement of the voltage and current being used. Like the smaller PMUs, these analog power supply ICs needed to be able to handle large transients as well as to turn on and off quickly. Along with customers needing to test memory and

processors, these power supply ICs were also used by customers needing to test LEDs. Testing LEDs in a mass production process required contacting the LED's power leads, turning the LEDs on as quickly as possible and then getting an accurate measure of voltage and current as quickly as possible after the turn-on transients have passed. LED testing is a very strenuous requirement for a power supply.

15. ATE Engines took the DUT/PMU power supply architecture in a different direction by designing an IC that could be programmed to perform as a driver-comparator with a 50 ohm output and then re-programmed and changed into a DUT power supply capable of driving more than 1 amp through the same output pin with low impedance. Unfortunately, their designs struggled to deal with the various transients involved with mass production testing of various DUTs. As with Planet ATE, I took the early versions of this IC to my customers in Japan and worked through their evaluations and design studies. All in all, through my career I have worked with electronics from 1976 until the present time, concentrating upon consumer electronics and the power supplies relevant to this case since 1989.

16. I also have 7 issued U.S. Patents in displays and display technology.

B. Basis of My Opinion and Materials Considered

17. I have reviewed the '705 Patent, including the claims of the patent in view of the specification. In addition, I have reviewed the '705 Patent's prosecution

history, Mr. Betancourt's declaration (Ex. 1003), the prior art discussed herein, and the remaining exhibits listed herein.

C. Summary of Opinions

18. In my opinion, claims 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 29, and 31-34 of the '705 Patent are not rendered obvious by the prior art combinations cited in Grounds 1-4. In the remainder of this declaration, I demonstrate these in detail and also address the lack of motivation to combine certain references.

II. LEGAL STANDARDS TO BE APPLIED

19. Counsel has advised me of the following legal standards that are relevant to IPR proceedings, which I have applied in forming my opinions.

20. I understand that an inter partes review ("IPR") is a proceeding before the United States Patent & Trademark Office for evaluating the patentability of an issued patent's claims based on prior-art patents and printed publications.

A. Person of Ordinary Skill in the Art

21. I understand that the claims of a patent are reviewed from the point of view of a hypothetical person of ordinary skill in the art ("POSITA") at the time of the filing of the patent. The "art" is the field of technology to which a patent relates.

B. Claim Construction

22. I understand that, in IPR proceedings, claim terms in a patent are given their ordinary and customary meaning as understood by a POSITA in the context of

the entire patent and the prosecution history pertaining to the patent. If the specification provides a special definition for a claim term that differs from the meaning the term would otherwise possess, the specification's special definition controls. I have applied these standards in preparing the opinions in this declaration.

C. Validity

23. I understand that, in this proceeding, Petitioner has the burden of proving that the challenged claims of the '705 Patent are unpatentable by a preponderance of the evidence. I understand that "preponderance of the evidence" means that a fact or conclusion is more likely true than not true.

24. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can "anticipate" the claim. Second, the prior art can render the claim "obvious" to a POSITA. I understand that for an invention claimed in a patent to be patentable over the prior art, it must not be anticipated and must not be obvious based on what was known before the invention was made.

25. I understand that a patent claim may be invalid as anticipated under 35 U.S.C. § 102 if a prior art reference discloses each element of the claimed subject matter.[1]

[1] Patent laws discussed herein refer to AIA versions of the relevant laws.

26. I understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of non-obviousness (i.e., "secondary considerations").

27. I further understand that when a party alleges obviousness, that party may rely on one reference or a combination of multiple references. I also understand that, when a party alleges obviousness based on a combination of references, that party should identify a reason why a POSITA would have been motivated to combine the asserted references in the manner recited in the claims and to explain why a POSITA would have had a reasonable expectation of success in making such combinations.

28. I understand that an obviousness analysis permits the application of "common sense" in examining whether a claimed invention would have been obvious to a POSITA. For example, I understand that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. And I

understand a party asserting obviousness should still provide a specific motivation to combine the references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

29. I understand that one indicator of nonobviousness is when prior art teaches away from combining certain known elements. For example, a prior art reference teaches away from the patent's particular combination if it leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent's result, or otherwise indicates that a seemingly inoperative device would be produced.

III. TECHNOLOGY OVERVIEW

30. The relevant field for that of the '705 Patent is that of solid state lighting systems, and more particularly to a lighting system enhanced lighting uniformity. '705 Patent, 1:6-8.

IV. THE '705 PATENT'S OVERVIEW

31. The '705 Patent recognized a need for "displays systems that are light in weigh, have a thin profile, that enable use of large screens, and that are uniformly lit over the entire display with superior color and contrast." *Id.* 2:53-56.

32. Specifically, the '705 Patent provides for an LCD system comprising an LCD panel, at least one waveguide element comprising a plurality of light entry regions, a first light-emitting source positioned to emit light into the one of the

plurality of light entry regions and at least a second light-emitting source positioned to emit light into a second light entry region of the waveguide element. *Id.* 2:64-3:5.

33. This is illustrated by the exemplary light guides below:

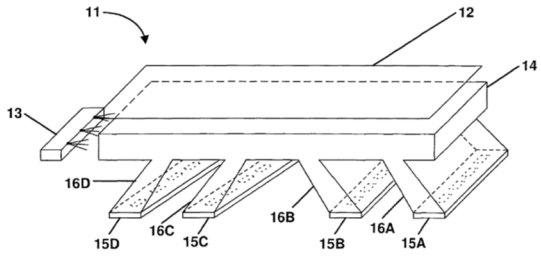


FIG.2

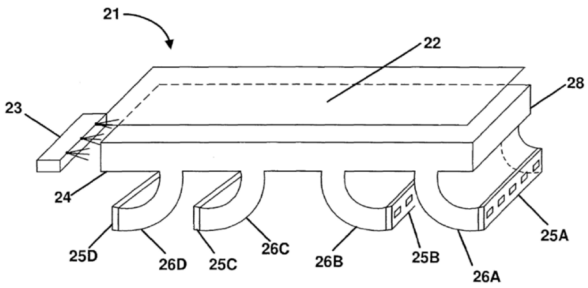


FIG.3

With this multiple entry lightguide structure, this allows for more uniform lighting, removes the "headlight effect" or "hot spot" on the panel and allows for larger screen sizes.

A. Person of Ordinary Skill in The Art

34. I understand that the factors considered in determining the ordinary level of skill in a field of art at issue include the level of education and experience of persons working in the field; the types of problems encountered in the field; and the sophistication of the technology at the time of the purported invention, which I understand to be as early as July 29, 2007. I understand that a person of ordinary skill in the art ("POSITA") is not a specific real individual, but rather is a hypothetical individual having the qualities reflected by the factors above. I understand that a POSITA would also have knowledge from the teachings of the prior art, including the art cited below.

35. Based on these factors, on or before July 29, 2007, a POSITA relating to the technology of the ’705 Patent would have (a) a Bachelor's of Science degree in a technical field and at least four years of experience in the field of design and/or manufacture of display systems; (b) a Master's of Science degree in a technical field and at least two years of experience in the field of design and/or manufacture of display systems; or (c) a PhD in a technical field relating to the design and/or manufacture of display systems. Additional graduate education could substitute for professional experience, or significant experience in the field could substitute for formal education. A POSITA is presumed to have knowledge of all relevant prior art, and therefore would have been familiar with each of the references cited in this declaration and the full range of teachings they contain.

36. With respect to the subject matter of the ’705 Patent, a Bachelor of Art in Mathematics is equivalent to a Bachelor of Science degree in a technical field.

37. Before July 29, 2007, my level of skill in the art was at least that of a POSITA. I am qualified to provide opinions concerning what a POSITA would have known and understood at that time, and my analysis and conclusions in this declaration are from the perspective of a POSITA prior to July 29, 2007. Furthermore, I have taught, worked with and supervised persons whom I would consider to be persons of ordinary skill in the art according with the description given above.

V. CLAIM CONSTRUCTION

38. For IPR petitions filed after November 13, 2018, I understand the Patent Trial and Appeal Board ("Board") construes claim terms as having their ordinary and customary meaning to a POSITA at the time of invention (i.e., the same standard used in district court). I have applied this standard in rendering my opinions on claim construction. In addition, I have been asked to assume that the claims are not indefinite.

39. Claim terms are generally given their plain and ordinary meaning, which 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. When the words in the context of the surrounding claim language make the ordinary meaning readily apparent, claim construction involves little more than the application of the widely accepted meaning of commonly understood words.

40. The claims must be read in view of the specification of which they are a part. The specification is the best source for understanding a technical term. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

41. Although terms must be construed in light of the specification, it is improper to import a limitation from the specification into the claims. Courts must capture the scope of the actual invention, rather than strictly limit the scope of claims

to disclosed embodiments or allow the claim language to become divorced from what the specification conveys is the invention.

42. The prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be. The prosecution history consists of the complete record of the proceedings before the PTO and includes the prior art cited during the examination of the patent.

43. I understand that in the parallel district court litigation, Hisense has proposed a construction for the terms "waveguide element" and "light entry regions."

VI. PETITIONER'S PRIOR ART SUMMARY

44. I understand that Petitioner has identified two primary references and one secondary references as prior art to the '705 Patent in its Grounds 1-4.

A. Johnson

45. U.S. Patent No. 6,608,614 Ex. 1005 ("Johnson") has a filing date of June 22nd, 2000.

46. Johnson is directed to a backlight for an LCD. The backlight includes a first LED array that provides light with a first chromaticity and a second array that provides light with a second chromaticity. A combining element combines the LED

arrays and directs the combined light towards the LCD. Further, Johnson states, the "[b]acklight assembly 10 includes a base 14 that has a principal or first LED array 16 disposed thereon. First LED array 16 is comprised of a plurality of LEDs 18... LEDs 18 provide light with a first chromaticity, which in the present embodiment is white or near-white." Johnson, 2:54-62. Johnson also teaches a control system that is operationally connected to the second LED array. This controller adjusts the brightness of at least one LED in the second LED array, thereby adjusting the chromaticity of the combined light. Johnson, 2:5-8.

B. Suzuki

47. U.S. Patent Publication No. 2006/0220040 (Ex. 1006 – "Suzuki"). Suzuki was filed February 28th, 2006 and published October 5th, 2006.

48. Suzuki is directed to a surface illuminator for a liquid crystal display and provides a surface illuminator employing an array of discrete light sources.

49. Suzuki describes an edge lighting arrangement for illuminating an LCD panel employing an array of light sources which are arranged around the periphery of the light guide. The light sources may be LEDs. Suzuki preferentially employs R,G,B LEDs whose light is combined within the light guide to produce light which is perceived as white when it is emitted from the surface of the light guide. Suzuki, [0008] Suzuki employs reflective panels on the surfaces of the light guide which are perpendicular to the surfaces on which the light sources are mounted. In order to

prevent imbalanced color mixture resulting from light emissions from the LEDs mounted nearest these reflective surfaces mixing with emissions from other LEDs at inappropriate locations in the lightguide, Suzuki provides that "the end light source LEDs 8R may be made to emit light in a quantity smaller than that emitted by the other LEDs 7R by a predetermined amount by supplying the end light source LEDs 8R with a current smaller than a current supplied to the LEDs 7R by a predetermined amount. Alternatively, R (red) emission LEDs having low emission efficiency may be used as the end light source LEDs 8R." Suzuki, [0044] In this way, Suzuki seeks to optimize the color balance of the light in the lightguide by selecting the color and emission intensity of the LEDs mounted nearest to the reflective surfaces.

C. Fine

50. U.S. Patent No. 8,128,272. (Ex. 1007 – "Fine") Fine issued from Patent Application Number 11/921,305 with a PCT filing date of June 7th, 2006 which purported claims the benefit of US provisional application no. 60/687,865 filed on June 7, 2005

51. Fine is directed to an illumination apparatus having a light emitting source embedded in a flexible waveguide material as shown below in Fig. 1c.

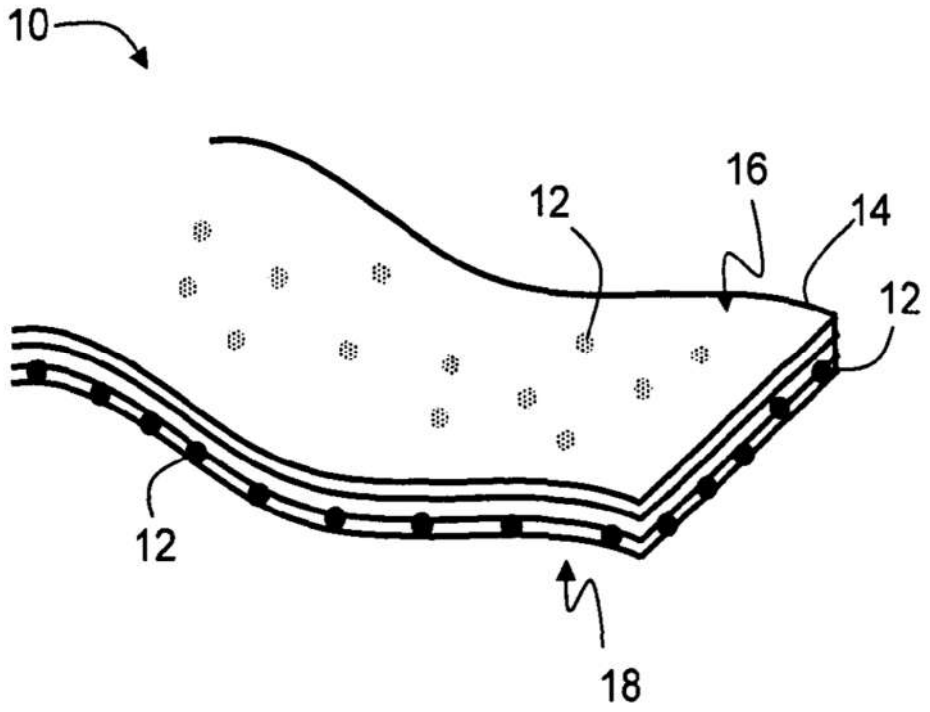


Fig. 1c

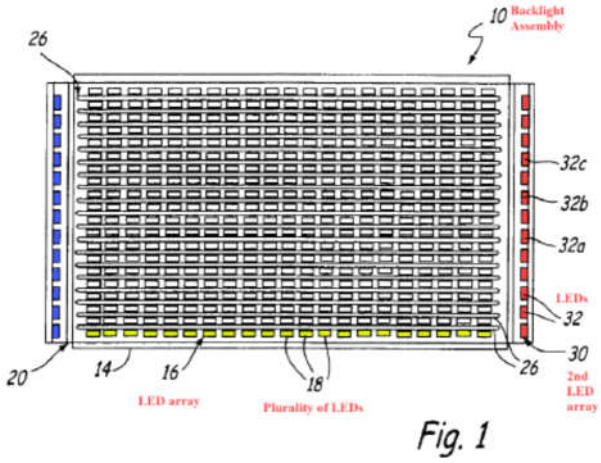
52. Fine's Fig 1c above shows the flexible "wave guide" 14, embedded LED "light sources" 12, the top, light emitting "first surface" 16 and the bottom "second surface" 18. Fine column 12, lines 57 to 62 describe a reflector positioned by 18 to prevent light from emitting in that direction. Fine also discloses various uses of the waveguide and display device.

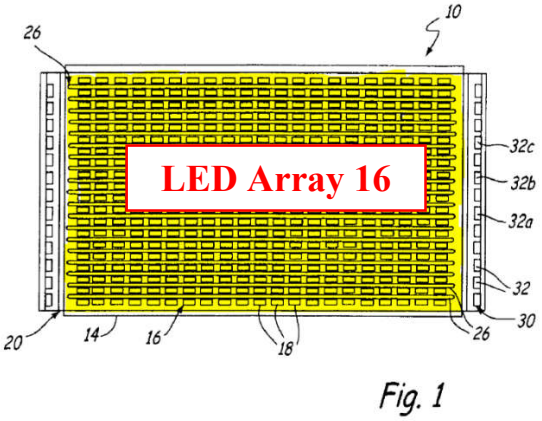
VII. GROUND 1 – JOHNSON IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 2, 5, 6, 9, 11, 13, 14, 16, 17, 22, 28, 32, AND 34.

53. Petitioner relies on Johnson as its primary reference for Ground 1. But it is my opinion that a POSITA would not find independent claim 1 or its dependent claims obvious in view of Johnson.

A. Johnson Fails to Disclose [Claim 1C] "a first light-emitting source comprising a first plurality of LEDs arranged in a first strip and positioned to emit light into the at least one waveguide element at a first light entry region of the plurality of light entry region."

54. Petitioner's reading of Johnson and claiming that the "LED array 16" of Johnson is the same as a first strip is misrepresentation of Johnson. Johnson does not teach or suggest that LED array 16 is a strip of LEDs on the bottom, but rather the entire grouping of LEDs on the substrate.





55. Johnson states that "Backlight assembly 10 includes a base 14 that has a principal or first LED array 16 disposed thereon. First LED array 16 is comprised of a plurality of LEDs 18." Johnson, 2:54-57. A POSITA would understand that Johnson illustrates that ***LED array 16*** in one substrate that houses the plurality of LEDs 18 refers to the two dimensional array made up of all of the LEDs on base 14.

56. Based on the teachings of Johnson, a POSITA would not interpret the separate LEDs 18 on base 14 as individual one dimensional arrays or strips. Furthermore, the light scattering strips 26 do not separate the LEDs 18 in LED array

16 into strips. These light scattering strips painted or etched onto first major surface 22. Light scattering strips 26 typically do not substantially interfere with the passage of light from first LED array 16 through waveguide 20.

B. Johnson Fails to Disclose [Claim 1E] "a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs."

57. The control system of Johnson which adjusts the "LEDs 32 in second LED array 30 to correct or compensate for the difference between actual chromaticity A and target chromaticity T" does not teach or suggest the "common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs" as taught in the '705 Patent.

58. Johnson only teaches that a controller 44 connects power supply 42 with the LEDs. And that the controller 44 varies the power supplied to the second LED array 30. *See* Johnson, 4:3-6. This is not the same as the common control circuit of the '705 Patent which "regulate…power to the LEDs, intensity of the emitted light, **wavelength of the emitted light, and/or other parameters."** '705 Patent, 12:6-15 (emphasis added). The control system 40 of Johnson does not regulate the wavelength or other parameters of the first led array 16; the controller 44 only adjusts the power supplied to the LED array. Therefore, Johnson does not teach this element.

C. Johnson Does Not Disclose "wherein each LED of the first plurality of LEDs and second plurality of LEDs is adapted to output substantially the same wavelength." of Claim 9.

59. Johnson teaches that "[s]econd LED array 30 includes a plurality of LEDs 32 that, individually and/or collectively, emit light with a chromaticity that is ***different*** from the chromaticity of light emitted by first LED array 16." Johnson, 3:17-22.

60. A POSITA would not be motivated to modify the arrays to output substantially the same wavelength in direct contrast to what is taught in Johnson. Johnson teaches mixing chromaticity of commonly available LEDs to achieve a desired chromaticity. Johnson, 1:59-61.

61. It does not matter what light the first LED array emits; a POSITA would understand that Johnson intends for the second LED array to emit a different light. Further, Johnson never discloses that the second LED array 30 emits a "near-white" light. A POSITA viewing Johnson would understand that the second LED array 30 emitting a near-white light would obviate the purpose of that second LED array. Johnson is directed to the mixing of light between the LED arrays to create a desired chromaticity. Mixing near-white light from the first LED array and near-white light from the second LED array would not adjust or create a desired chromaticity. Therefore, the LEDs in the first and second LED arrays of Johnson would not output substantially the same wavelength as required by the '710 Patent.

VIII. GROUND 2 - PETITIONER'S SUZUKI IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 1, 2, 5, 11, 13, 14, 16, 17, 32, AND 34.

62. Petitioner relies on Suzuki as its primary reference for Ground 2. But it is my opinion that a POSITA would not find independent claim 1 or its dependent claims obvious in view of Suzuki.

A. Suzuki Fails to Disclose [Claim 1E] "a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs."

63. Based on my review of Suzuki, Suzuki does not teach or suggest a common control circuit or even an LED driver.

64. Suzuki discloses a means for modulating the amount of light that is reflected off of reflective surfaces 13L and 13R shown in Figure 4. This means for modulating includes reducing the emission of light from the 8R LEDs in that figure. In this way, less light is bounced off of the reflective surfaces, thereby improving the uniformity of the light emission through the lightguide of Suzuki. Suzuki uses a **predetermined** reduction in light emission, it is not regulated by a control circuit. Suzuki did not intend to vary the intensity of the emission of light from the light sources, going so far as to recommend the use of low emission efficiency LEDs to cap the amount of light produced thereby.

65. The only mention of an alleged control circuit in Suzuki is a vague reference to a LED driving circuit which control the intensity of red LEDs in a single LED strip. Suzuki, [0044] There is no discussion that a common control circuit is

used for LEDs on multiple strips. In fact, Suzuki teaches eliminating a need for adjusting an LED driving circuit. Suzuki, [0053].

66. As such, Suzuki does not disclose a common control circuit in electrical communication with at least one of the first plurality of LEDs and the second plurality of LEDs

B. Suzuki does not disclose a "wherein any of the first light emitting source and the second light emitting source comprises a plurality of LEDs adapted to emit any of white light and single color light" of Claim 5.

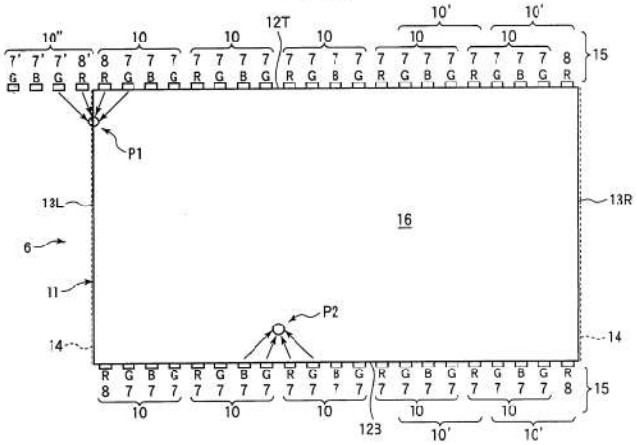
67. The '705 Patent distinguishes between white light, blue light, red light, green light or light of any desirable wavelength. This claim specifically recites LEDs adapted to be able to emit white light. Nothing in the edge lit RBG system of Suzuki discloses LEDs adapted to emit white light. Suzuki discloses only color mixing using red, blue, and green LED emission to generate a beam of light in a desired color. If the light sources of Suzuki are adapted to emit a near white light, then it must be through color mixing in the light guide and would require light from all three sources (RGB). If the light sources of Suzuki are adapted to emit a single color light, then the light source must be a set of LEDs of a single color which would obviate their ability to emit a perceived white light.

C. Suzuki Fails to Disclose "a common control circuit in electrical communication with each LED of at least one of the first plurality of LEDs and the second plurality of LEDs" of Claim 11.

68. As discussed in my declaration above, Suzuki does not disclose a common circuit as claimed in the '705 Patent.

69. Suzuki teaches an LED driving circuit is in communication with each LED (8R, 7R).

FIG.4



70. In its arguments for Claim [1C] and [1D], Petitioner argued that the elements were met by LED light sources 15 " [top row] and LED light sources 15 [bottom row]. As such, 8R and 7R do not make up all of the LEDs in the first plurality of LEDs and the second plurality of LEDs. As such, a POSITA would not recognize that Suzuki teaches a common circuit in electrical communication ***with each*** LED.

D. Suzuki Fails to Disclose "a third light emitting source positioned to emit light into the at least one waveguide element" of Claim 34

Petitioner argues that this is met by each set 10 of LEDs in Suzuki. I disagree. In the '705 Patent, this refers to a third light emitting source emitting light as shown below (e.g., 15A, 15B, 15C).

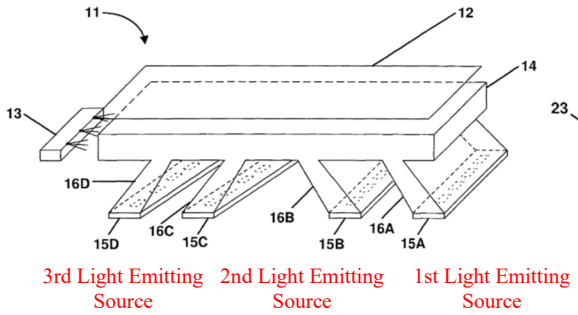


FIG.2

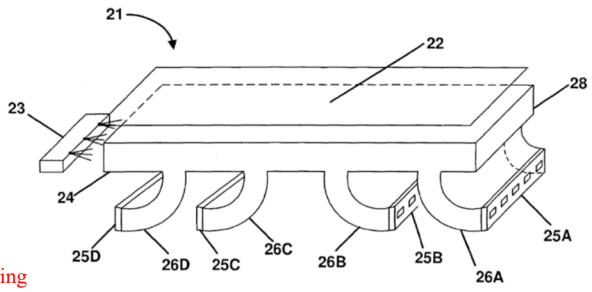
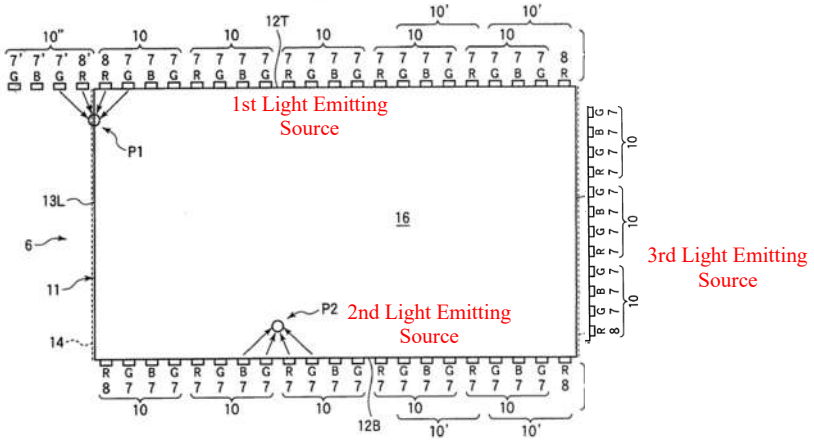


FIG.3

71. However, this is not taught in Suzuki as Suzuki teaches edge lighting on two sides. Adding a third light emitting source would result in the following:

FIG.4



72. A POSITA would not be motivated to construct this structure as it would create ununiform light by having unbalanced light emitting sources.

IX. GROUND 3 – BECAUSE JOHNSON IN VIEW OF A POSITA DOES NOT RENDER INDEPENDENT CLAIM 1 OBVIOUS, THE ADDITION OF FINE DOES NOT RENDER DEPENDENT CLAIMS 32 AND 33 OBVIOUS.

73. Based on my understanding of patent law, dependent claims 32 and 33 include all of the base limitations of independent claim 1. Fine discloses embodiments including a computer monitor and a television system. Petition at 59 citing Fine, 5:41-48. Fine does not teach or suggest the elements of independent claim 1 missing from Johnson such as [1C] and [1E]. As such, adding Fine does not render claims 32 and 33 obvious.

X. GROUND 4 – THE COMBINATION OF SUZUKI AND FINE IN VIEW OF A POSITA FAILS TO RENDER OBVIOUS CLAIMS 6, 22, 28, 29, 32, AND 34.

A. A POSITA Would Not Be Motivated to Combine Suzuki and Fine.

74. Suzuki is directed to an edge lighting system which is a different system than direct lighting systems. In an edge lighting arrangement, LEDs are positioned such that the emission of light is *perpendicular* to the viewing plane of the LCD panel. In a back or direct lighting arrangement, LEDs are positioned such that the emission of light is *parallel* to the viewing plane of the LCD panel.

75. On the other hand, Fine discloses a specific type of flexible waveguide having LEDs embedded in the waveguide, not disposed along an outer edge of the waveguide.

76. Embedding light emitting elements in the light guide of Suzuki would inter-fere with the operation of the dots which act to scatter light. The embedded light emitting elements would be between the dots 24 and the exit surface 16 in Suzuki. Further, Petition does not explain how such electrical connections would be made if light emitting elements were to be embedded in the light guide of Suzuki as the electrical lines would have to run through the reflectors 20 of Suzuki. Fine does not include a reflector on the sides of the light guide such as the one described in Suzuki nor does it include light scattering dots. Therefore, a system such as the one proposed by Petitioner would function less effectively compared to Suzuki or Fine as they are described in their respective specifications. As such, a POSITA would not be motivated to combine the teachings of Suzuki and Fine.

B. The combination of Suzuki and Fine does not disclose [Claim 6] "wherein any of the first light emitting source and the second light emitting source comprises a plurality of direct LEDs."

77. As discussed Supra, there is no motivation to combine the edge lighting system of Suzuki with the flexible LED embedded waveguide of Fine. A POSITA would not be motivated to modify Suzuki's use of a waveguide for directing LEDs on the edge of the base to incorporate LEDs embedded in waveguide. Because Suzuki's device uses edge lighting, a POSITA would not be motivated to then add direct LEDs embedded in the waveguide as taught in Fine to the teachings of Suzuki.

This would be redundant and create unnecessary expense. If Direct LEDs were used, then edge lighting would be unnecessary as direct LEDs can cover the entire screen.

78. A POSITA would not have considered combining Direct LEDs with a device which already included edge lighting sources which operates with a light guide to disperse the edge lighting throughout the display as it would add unnecessary cost to a display by adding extraneous LEDs and would not have been a suitable consideration.

79. Petitioner does not explain how either Suzuki or Fine teach how to design a common controller to control both the edge lighting sources of Suzuki with the direct LEDs of Fine.

80. Second, Petitioner's claim that it would be obvious to add an LED to the "gas space between the lightguide and other optical elements," is incorrect. Evidence of this flaw can be seen from Figure 2 of Suzuki below.

81. The gas space to which Petitioner is referring is labelled 30. The gas space is *above* the light guide 11 of Suzuki. Petitioner does not elaborate as to how a POSITA would accomplish this arrangement. Petitioner seems to be implying that a light source placed in the gas space *above the light guide* would still be both embedded in the light guide (per Fine) so as to pass light through the light guide and constitute a direct light.

82. Placing light sources in the gas space of Suzuki would block light from the lightguide as well as not be within the teachings of Fine as the light sources would not be embedded in the light guide.

83. Petitioner also argues that Suzuki's gas space 30 between the lightguide and other optical elements would work well for an LED array such as Fine. Petition at 63. This is incorrect. The gas space is a necessary space to mix the light sources of Suzuki and is designed to be between 9 to 18mm. Suzuki [0028, 0031] Fine states that the thickness of each layer (which 3 layers are required) is 3mm, totaling 9mms. Inserting the direct LEDs embedded in a waveguide of Fine would eliminate or significantly reduce the gas space and as such is an unsuitable option.

C. The combination of Suzuki and Fine does not disclose [Claim 22] " wherein any of the first light-emitting source and the second light-emitting source is optically coupled to a back portion of the at least one waveguide element."

84. Fine does not disclose light emitting sources optically coupled to the back portion of a waveguide element within the meaning of the '705 patent. The '705 patent uses the term "optically coupled" as follows: a front portion of a waveguide is optically coupled to transmit light to a LCD panel or screen…" '705, 6:57-59. This language shows that the '705 Patent does not include "embedded" within the definition of "optically coupled" as it would be unproductive to embed a waveguide into an LCD panel. Embedding an LED inside a waveguide would not

be equivalent as optically coupled to a back portion of the at least one waveguide element.

85. Even to the extent that Fine discloses light-emitting sources "optically coupled to a back portion of a waveguide element", a POSITA would not find it suitable to move the edge lighting LEDs to a back portion of the light guide thereby removing the edge lighting LEDs from the side of the light guide that was directing the light. This would change the entire system of Suzuki and would require a completely distinct light guide not disclosed of in either Suzuki or Fine.

D. The combination of Suzuki and Fine does not disclose [Claim 28] "wherein any of the first light emitting source and the second light emitting source is disposed along a center region of the LCD system behind the LCD panel is positioned to emit light into a back side of the at least one waveguide element."

86. As discussed above, because Fine teaches that a light source is embedded in the bulk of waveguide material or near the surface, it cannot then teach that the light emitting source is disposed along a center region of the LCD system behind the LCD panel, and is positioned to emit light into a back side of the at least one waveguide element. These two descriptions would be contradictory. This is evident from the figures of Fine.

87. Petitioner's argument that a POSITA would understand that Suzuki & Fine would include an assembly that includes light emitted from LEDs 12 ***on*** the back side of waveguide element 14 is irrelevant to this claim. The claim is not

related to emitting on the backside, but rather having the LEDs emitting into the backside of the waveguide.

88. I declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Dated January 26, 2024, By
William K. Bohannon,