**UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

CORETRONIC CORPORATION AND OPTOMA CORPORATION,
Petitioners,

v.

MAXELL, LTD.,
Patent Owner

**Case: IPR2025-00475**

**U.S. Patent No. 9,322,530**

# PATENT OWNER PRELIMINARY RESPONSE TO PETITION FOR *INTER PARTES REVIEW* OF U.S. PATENT NO. 9,322,530

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## TABLE OF EXHIBITS

| Exhibit No. | Description |
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| EX2001 | Complaint, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 1) (filed July 9, 2024) |
| EX2002 | March 26, 2025, Memorandum to All PTAB Judges from Coke Morgan Stewart, Acting Secretary of Commerce for Intellectual Property, Regarding the Interim Processes for PTAB Workload Management |
| EX2003 | First Amended Docket Control Order, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 65) (January 7, 2025) |
| EX2004 | Email from D. Min to D. McPhail, dated June 3, 2025 |
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| EX2006 | Order Denying Motion to Transfer, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 105) (June 3, 2025) |
| EX2007 | Order Granting Motion to Dismiss, *Optoma Technology, Inc.v. Maxell, Ltd.*, No. 3:24-cv-08147-TLT (N.D. Cal.) (Dkt. 58) (March 14, 2025) |
| EX2008 | Report and Recommendations re [020] Defendants' Motion to Dismiss, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 96) (May 16, 2025) |
| EX2009 | Report and Recommendations re [022] and [024] Defendants' Motion to Dismiss, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 97) (May 16, 2025) |
| EX2010 | Plaintiff's Preliminary Election of Asserted Claims, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 78) (March 11, 2025) |
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| EX2012 | Preliminary Election of Asserted Art, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (served on |

| | |
|---|---|
| | March 25, 2025) |
| EX2013 | Exhibit D (530 Invalidity Claim Based on Publications) to Defendants' Invalidity Contentions, *Maxell, Ltd. v. Coretronic Corp.*, No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (served on December 27, 2024) |
| EX2014 | USPTO Rescinds Memorandum Addressing Discretionary Denial Procedures (February 28, 2025), https://www.uspto.gov/about-us/news-updates/uspto-rescinds-memorandum-addressing-discretionary-denial-procedures |
| EX2015 | March 24, 2025, Memorandum to Members of the Patent Trial and Appeal Board from Scott R. Boalick, Chief Administrative Patent Judge, Guidance on USPTO's Recission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" |
| EX2016 | FAQs for Interim Processes for PTAB Workload Management, https://www.uspto.gov/patents/ptab/faqs/interim-processes-workload-management |

## LISTING OF CHALLENGED CLAIMS[1]

| Claim | Claim Text |
|---|---|
| [1p] | A light source device, comprising: |
| [1a] | a plurality of excitation light sources which emit excitation light; |
| [1b] | a phosphor which changes the excitation light to fluorescent light; |
| [1c] | a dichroic mirror which transmits the excitation light and reflects the fluorescent light; and |
| [1d] | a condensing lens which condenses the excitation light transmitted through the dichroic mirror in an excitation light irradiation region on the phosphor, |
| [1e] | wherein the plurality of light sources are arranged so that each excitation light emitted from each of the plurality of light sources enters asymmetrically to a center of the condensing lens; and |
| [1f] | wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an |

[1] For convenience purposes only, Patent Owner adopts for this Preliminary Response the numbering of claim elements advanced by Petitioners in the Petition (Paper 2). Patent Owner does not concede the appropriateness of such grouping and numbering of claim elements.

| | |
|---|---|
| | elevation angle θ, θ≠0 is satisfied. |
| [3] | The light source device according to claim 1, wherein when the excitation light irradiation region is a center, in an incident angle to the excitation light irradiation region of first excitation light of each of the excitation lights, an elevation angle is θm and an azimuth angle is φm, and in an incident angle to the excitation light irradiation region of second excitation light different from the first excitation light, an elevation angle is θn and an azimuth angle is φn, there is no pair of the excitation lights in which θm−2°≦θn≦θm+2°, and φm+178°≦φn≦φm+182° are established. |
| [4] | The light source device according to claim 1, wherein the excitation light source is a solid light-emitting element. |
| [7p] | A projection type video display device, comprising: |
| [7a] | the light source device according to claim 1; |
| [7b] | a video display element; |
| [7c] | an illumination optical system which has a plurality of optical elements applying light from the light source device to the video display element; and |
| [7d] | a projection lens which enlarges and projects an optical image formed by the video display element. |
| [9p] | A light source device, comprising: |
| [9a] | an excitation light source which emits excitation light; |
| [9b] | a phosphor which changes the excitation light to fluorescent light; |

| | |
|---|---|
| [9c] | a dichroic mirror which transmits the excitation light and reflects the fluorescent light; and |
| [9d] | a condensing lens which condenses the excitation light transmitted through the dichroic mirror in an excitation light irradiation region on the phosphor, |
| [9e] | wherein the excitation light sources are arranged so that when excitation light emitted from the excitation light source enters the excitation light irradiation region and is reflected without being converted into fluorescent light, the unconverted excitation light is prevented from entering the excitation light source; and |
| [9f] | wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied. |

## I. INTRODUCTION

Patent Owner Maxell, Ltd. ("Patent Owner") respectfully requests that the Board deny institution of the Petition filed by Coretronic Corporation and Optoma Corporation (hereinafter "Petitioners") challenging the patentability of claims 1, 3, 4, 7, and 9 ("challenged claims") of U.S. Patent No. 9,322,530 ("the '530 Patent") (EX1001).

Petitioners have failed to demonstrate a reasonable likelihood of success on the grounds submitted in its Petition. None of the cited references, whether taken alone or in reasonable combination, disclose or render obvious the arrangement of each limitation in the challenged claims. Moreover, the Petition is filled with conclusory statements that fail to demonstrate a reasonable likelihood of success on any ground and are neither bolstered nor supported by Dr. Jose Sasian's declaration (EX1003), which simply parrots Petitioners' conclusions without additional analysis or evidence. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

For at least these reasons, Petitioners has failed to meet their burden of showing a reasonable likelihood of prevailing. Accordingly, the Board should deny Petitioners' request to institute *inter partes* review.

## II. BACKGROUND

### A. Overview of the '530 Patent

The '530 Patent, entitled "Light Source Device," is generally directed to improving light source devices. *See* EX1001 1:5-48. During the time of the '530 Patent, light source devices were arranged such that unconverted light may enter an excitation light source, thereby reducing the output and life of the excitation light source. *See* EX1001 1:28:34. The object of the invention was to improve the output and life expectancy of the excitation light source in view of this problem. *See* EX1001 1:35-37.

To accomplish this, the '530 Patent describes an arrangement "provided with a plurality of excitation light sources emitting excitation light and a phosphor changing the excitation light to fluorescent light, and the excitation light sources are arranged so that each excitation light emitted from each of the excitation light sources asymmetrically enters an excitation light irradiation region on the phosphor." EX1001 1:41-48.

### B. Patent Prosecution History

U.S. Patent Application No. 14/240,799—which would ultimately issue as the '530 Patent –was filed on September 26, 2012. The associated PCT application number is PCT/JP2012/074617 and claims priority to PCT/JP2011/005358, filed on

September 26, 2011.

## III. SUMMARY OF PETITIONERS' PROPOSED GROUNDS FOR UNPATENTABILITY

Petitioners allege that claims 1, 3, 4, 7, and 9 of the '530 Patent would have been obvious under pre-AIA 35 U.S.C. § 102 or § 103 and raises five grounds of alleged unpatentability. Pet. 11-12. The alleged invalidity grounds are summarized as follows:

| Ground | '530 Claims | Type of Challenge | References |
|---|---|---|---|
| 1 | 1, 4, 7 | § 102 and § 103 | Hirata |
| 2 | 1, 3, 4, 7, 9 | § 103 | Kurosaki, Alpay |
| 3 | 9 | § 103 | Kurosaki, Abu-Ageel |
| 4 | 1, 3, 4, 9 | § 103 | Huang, Alpay |
| 4a | 7 | § 103 | Huang, Alpay, Akiyama |
| 5 | 9 | § 103 | Huang, Abu-Ageel, Alpay |

## IV. LEVEL OF ORDINARY SKILL

For purposes of this preliminary response, a person of ordinary skill in the art would have had a Bachelor of Science degree in Electrical Engineering, Physics, Optics, or an equivalent degree, and at least one year of experience working in the

field of optical engineering, optical design, or a related field. Additional education and/or experience may provide a substitute for one of the qualifications of a person of ordinary skill in the art.

While Patent Owner's definition of a person of ordinary skill in the art differs from that of Petitioners' (see Petition at 13), the level of ordinary skill need not be resolved for the purposes of the preliminary response. Patent Owner reserves the right to contest Petitioners' definition at a later time.

## V. CLAIM CONSTRUCTION

For the purposes of the preliminary response, Patent Owner adopts the position that no terms need construction. Terms should be given their plain and ordinary meaning.

## VI. LEGAL STANDARD

Under 35 U.S.C. § 102(a) (pre-AIA), an issued patent is invalid if "the invention [therein] was . . . described in a printed publication . . . before the invention thereof by the applicant." This statute "embodies the concept of novelty—if a device or process has been previously invented (and disclosed to the public), then it is not new, and therefore the claimed invention is 'anticipated' by the prior invention." *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). To anticipate, "the prior art reference . . . must not only disclose all elements of the claim within

the four corners of the document, but must also disclose those elements 'arranged as in the claim.'" *Id*. (citing *Connell v. Sears Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

A claim is also not patentable if the differences between the claim and the prior art are such that the subject matter as a whole would have been obvious to a person of ordinary skill in the art at the time of the invention. 35 U.S.C. § 103(a) (pre-AIA). Obviousness requires assessing (1) the "level of ordinary skill in the pertinent art," (2) the "scope and content of the prior art," (3) the "differences between the prior art and the claims at issue," and (4) "secondary considerations" of non-obviousness such as "commercial success, long felt but unsolved needs, failure of others, etc." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)).

It is the petitioner's burden to prove unpatentability, *E.I DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1007 (Fed. Cir. 2018), and "to demonstrate both 'that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (quotations and citations omitted). However, a petitioner must first show that all of

the claimed elements are disclosed in the prior art. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (considering motivation to combine and reasonable expectation of success only "if all the elements of an invention are found in a combination of prior art references").

## VII. THE PETITION DOES NOT SHOW A LIKELIHOOD OF PREVAILING WITH RESPECT TO ANY CHALLENGED CLAIM

### A. Ground 1: Petitioners Fail to Establish That Claims 1, 4, and 8 Would Have Been Anticipated or Obvious Based on Hirata

#### 1. Petitioners Fail to Establish That Claim Limitation [1d] Would Have Been Anticipated or Obvious In View of Hirata

Claim limitation [1d] recites "a condensing lens which condenses the excitation light transmitted through the dichroic mirror in an excitation light irradiation region on the phosphor." Petitioners fail to establish that claim limitation [1d] would be anticipated or obvious in view of Hirata.

Petitioners state the "the light incidence side of a transparent substrate 27" satisfies the "excitation light irradiation region" of limitation [1d], and that the yellow phosphor of Hirata satisfies the "phosphor" recited in limitation [1d]. Pet. 18-19.

However, claim limitation [1d] recites an "excitation light irradiation region ***on*** the phosphor." Petitioners fail to identify any "region" of the "yellow phosphor" described in Hirata that would satisfy the "excitation light irradiation region on the

phosphor" recited in limitation [1d]. *See* Pet. 18-19. Petitioners merely state that the "light incidence side of a transparent substrate 27" satisfies the "excitation light irradiation region on the phosphor. Also, Petitioners merely state that a transparent substrate 27 includes a yellow phosphor (the alleged "phosphor" of limitation [1d]), but do not identify any region on the yellow phosphor that would satisfy the "excitation light irradiation region on the phosphor" recited in limitation [1d]. *See* Pet. 18-19.

Petitioners' reliance on Hirata's "light incidence side" language to meet the claimed "excitation light irradiation region" is misplaced. The term "**side"** merely refers to a side of the transparent substrate 27 (*e.g.*, front side or back side) and does not disclose or suggest any ***region*** on the transparent substrate 27, much less identify any region on the yellow phosphor disposed on the transparent substrate 27 that would correspond to an "excitation light irradiation region on the phosphor."

Petitioners simply fail to provide any analysis for how "light incidence side" or any portion of Hirata satisfies the "excitation light irradiation region on the phosphor" recited in limitation [1d]. In relation to this element, Petitioners solely rely on Hirata. Even if Petitioners' argument was considered an obviousness argument, they provide **no** rationale on how the "excitation light irradiation region" would be rendered obvious. Petitioners' entire analysis of limitation [1d] comprises

a paragraph and an annotated figure on pages 18-19 of the Petition. Within the paragraph, Petitioners fail to provide ***how*** particular components of Hirata would meet the language of "excitation light irradiation region on the phosphor." With Petitioners' annotated graphic, Petitioners highlight a portion of transparent substrate 27 as the "excitation light irradiation ***center***"[2] with no explanation for how this portion of transparent substrate 27 could be mapped to such language. Petitioners' expert adds no such explanation, as his declaration merely copies the Petition for this limitation. Such cursory mappings cannot meet Petitioners' "burden of proving a proposition of unpatentability." 35 U.S.C. §316(e).

For at least the foregoing reasons, Petitioners fail to show a reasonable likelihood of success in establishing that claim limitation [1d] would have been disclosed or rendered obvious by Hirata.

### 2. Petitioners Fail to Establish That Claim Limitation [1e] Would Have Been Anticipated or Obvious In View of Hirata

Claim limitation [1e] recites "wherein the plurality of light sources are arranged so that each excitation light emitted from each of the plurality of light

[2] Petitioners fail to even annotate the "excitation light irradiation ***region***" that is recited in the claim element and instead refer to an "excitation light irradiation ***center***" that is recited in a different claim element.

sources enters asymmetrically to a center of the condensing lens." Petitioners fail to establish that claim limitation [1e] would be anticipated or obvious in view of Hirata.

Petitioners state that "two blue excitation light sources including a light emitting plane" depicted in Hirata's Figure 1B satisfies this limitation. Pet. 19. Petitioners further make conclusory assumptions that "each excitation light source 101 enters offset and tilted from the optical axis of the focusing lens 24." Pet. 19. The Petition is entirely unclear upon what evidence Petitioners base these assumptions.

In fact, rather than the light source "enter[ing] offset and tilted," Hirata discloses just the opposite. Hirata discloses that "The blue excitation light rays emitted ***substantially in parallel*** from the excitation light source device 300 pass through a dichroic mirror 14 . . . and are focused through a focusing lens 24 onto a light incidence side of a transparent substrate 27." EX1004 ¶ [0090]. Claim 1 of Hirata further supports the notion that the Hirata's light sources are not configured to be offset or tilted in relation to an optical axis of focusing lens 24 because claim 1 recites that "the light source comprises a light emitting plane having substantially a rectangle or an ellipse shape, a longitudinal direction of the shape of ***the light emitting plane being parallel to a longitudinal direction*** of each opening of the polarization conversion element."

While Petitioners rely on Figure 1B to state that the light sources are "tilted," Figure 1B is a diagram showing a perspective view of light emitting plane 102 and fails to properly show any exact angles or such of light emitting plane 102 with respect of focusing lens 24.[3] In addition, if Figure 1B is to be taken in this manner, Petitioners fail to show how each "excitation light emitted from each of the plurality of light sources enters asymmetrically to ***a center of the condensing lens***" and fails to indicate any portion of Figure 1B or accompanying description that demonstrates this portion of limitation [1e].

For its obviousness rationale, Petitioners state that "To the extent this is disputed, it would also have been obvious to offset the light source 101 and collimator lens 201 in a perpendicular direction to the plane of the figure (Z-axis) or along the X-axis of the Fig. 1B to avoid back reflections from reflected or scattered excitation light." Pet. 20. But this is contrary to the disclosure in Hirata, and Petitioners provide no explanation why a POSITA would modify Hirata in such a way. Petitioners again rely solely on their expert's declaration, which repeats verbatim the argument in the Petition and cites no additional evidence to support this

[3] Focusing lens 24 also appears to be shown with perspective and there does not appear to be any indication of what angle in which light emitting plane 102 contacts focusing lens 24.

conclusory allegation. Such an approach is improper. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

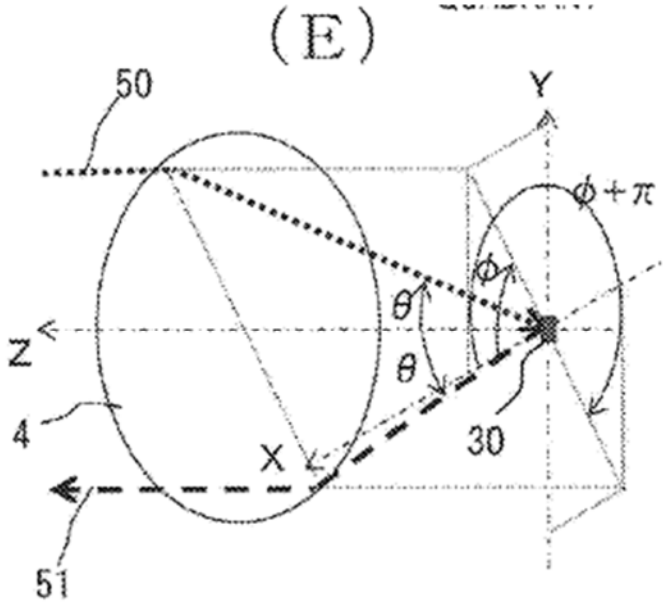
Additionally, Petitioners' proposed modification of Hirata is based on pure hindsight drawn directly from the '530 Patent. *See* EX1001 3:33-38 ("Similarly, unconverted excitation light 51c which is not converted into fluorescent light by the phosphor 3 of the excitation light 50c emitted from the excitation light source 5c enters the excitation light source 5a, and the reduction of output and life of the excitation light source 5a occurs (not shown).").

For at least the foregoing reasons, Petitioners fail to show a reasonable likelihood of success in establishing that claim limitation [1d] would have been disclosed or rendered obvious by Hirata.

### 3. Petitioners Fail to Establish That Claim Limitation [1f] Would Have Been Anticipated or Obvious In View of Hirata

Claim limitation [1f] recites "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied." Petitioners fail to establish that claim limitation [1f] would be anticipated or obvious in view of Hirata.

Limitation [1f] recites "***elevation*** angle." The claims and specification of the '530 Patent make clear that "elevation angle" is an angle related to ***elevation***, and distinguishes from other angles, such as an "azimuth angle," recited in claim 3. *See also* EX1001 Figs. 2A-2E. For example, the following figure from the '530 Patent illustrates the elevation angle (denoted by θ) and the azimuth angle (denoted by φ), and shows their relationships with respect to particular axes/coordinate systems:




EX1001 Fig. 2(E); *see also id.* at 6:37-48. The written description also supports that the elevation angle and azimuth angle are associated with particular axes/coordinate systems. EX1001 at 6:37-48. ("An elevation angle from the Z axis direction is θ, and an azimuth angle in an XY coordinate is φ.").

Petitioners completely fail to address the "**elevation** angle" portion of the claim. *See* Pet. 20-21. Petitioners rely on finding any difference in alleged "incident angles" throughout the Petition without addressing whether these angles are related to "elevation angles." For example, Petitioners state that "As a result, the ***incident angle*** to the excitation light irradiation region of any excitation light of each of the excitation light sources is not equal to zero." Pet. 21. This rationale fails to address the language of "elevation angle" at all and instead only states that the "incident angle . . . is not equal to zero." *Id.* Neither the Petition nor Petitioners' expert provides any explanation or reasoning why the terms "incident angle" and "elevation angle" can or should be used interchangeably. Nor does the Petition (or Dr. Sasian) cite any evidentiary support for doing so, or make any argument that an incident angle necessarily or inherently includes an "elevation angle," an "azimuth angle," or both. Claim 1 requires an incident angle that is an elevation angle $\theta$, where the elevation angle $\theta \neq 0$ is satisfied. The Petition's failure to address the claimed non-zero elevation angle $\theta$ cannot be cured simply by pointing to a generic "incident angle."

For at least the foregoing reasons, Petitioners fail to show a reasonable likelihood of success in establishing that claim limitation [1f] would have been disclosed or rendered obvious by Hirata.

#### 4. Petitioners Fail to Establish That Claims 4 and 7 Would Have Been Anticipated or Rendered Obvious in View of Hirata

Claims 4 and 7 depend on claim 1. Therefore, for at least the same reasons presented above in relation to claim 1 in Ground 1, Petitioners fail to establish that claims 4 and 7 would have been disclosed or rendered obvious in view of Hirata.

Therefore, Petitioners fail to show a reasonable likelihood of success in establishing that Claims 4 and 7 would have been obvious based on Hirata.

### B. Ground 2: Petitioners Fail to Establish That Claims 1, 3, 4, 7, and 9 Would Have Been Obvious Based on Kurosaki and Alpay

#### 1. Petitioners Fail to Establish that a POSITA Would Combine Kurosaki and Alpay

Petitioners rely on a combination of Kurosaki and Alpay for Ground 2. *See, e.g.*, Pet. 43.

However, Petitioners combination rationale is lacking. For example, Petitioners' remarks that "Both Kurosaki and Alpay both employ lasers" and that "Kurosaki and Alpay are analogous and/or complimentary art" are lacking. Pet. 29. Generally providing that references are in the "same field" is insufficient rationale. *See Securus Techs., Inc. v. Global Tel*Link Corp.*, 701 F. App'x 971, 977 (Fed. Cir. 2017).

Further, Alpay is directed to preventing "back-reflections" from a "laser beam reflected back to ***the*** laser ***from a work surface***." EX1005 ¶ [0003]. Therefore, Alpay

is directed to preventing laser reflections ***from a work surface*** back to the original laser, and also specifically preventing laser reflections from the specific laser. In other words, Alpay considers preventing back reflections from a single laser and does not contemplate preventing reflections from multiple lasers (*e.g.*, the back reflection from a first laser into a second laser). *See id.* This is reflected by Alpay's solution: "to 'tilt' the entire beam delivery subsystem with respect to the work surface 122 so that the angle of incidence of the beam hitting the work surface is not 90 degrees." For example, tilting the entire beam delivery subsystem with respect to a work surface may still cause the reflection from a first laser to affect a second laser.

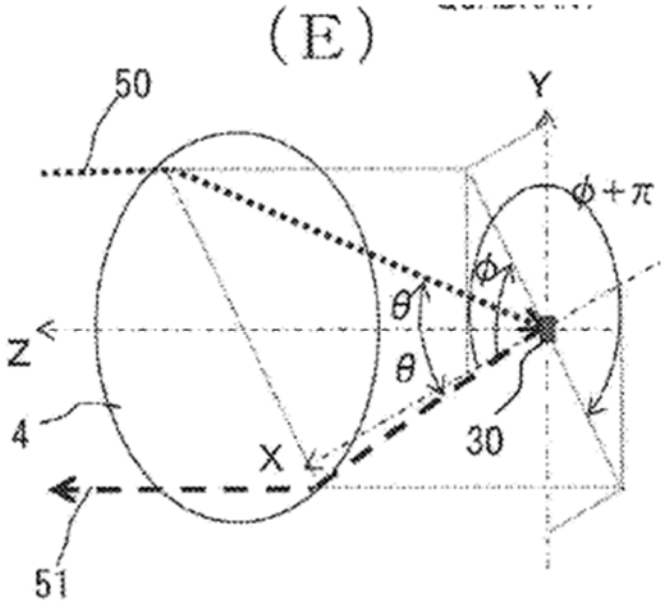
Therefore, Petitioners have failed to provide sufficient rationale to combine Kurosaki and Alpay and Ground 2 should fail for this reason alone.

### 2. Petitioners Fail to Establish That Claim Limitation [1f] Would Have Been Obvious In View of Kurosaki and Alpay

Limitation [1f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied."

As stated with respect to Ground 1, limitation [1f] recites "***elevation*** angle." The '530 Patent make clear that "elevation angle" is an angle related to ***elevation***, and distinguishes from other angles, such as an "azimuth angle," recited in claim 3.

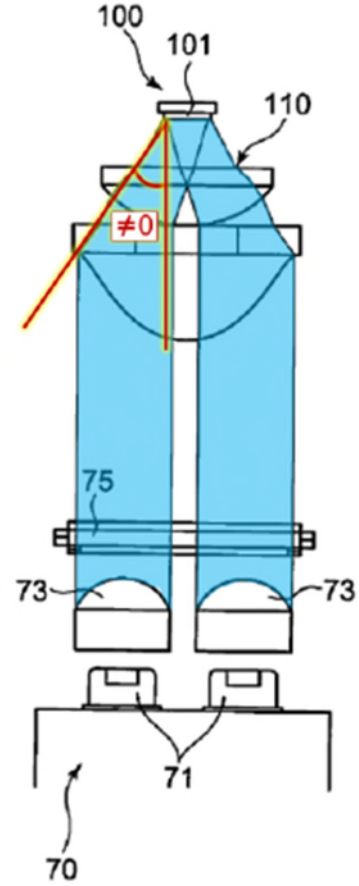
*See also* EX1001 Figs. 2A-2E. The Petition and Dr. Sasian do not contend otherwise, nor is any support provided to use the term "incident angle" interchangeably with "elevation angle" and/or "azimuth angle." For example, the following figure from the '530 Patent illustrates the elevation angle (denoted by θ) and the azimuth angle (denoted by φ), and shows their relationships with respect to particular axes/coordinate systems:




EX1001 Fig. 2(E); *see also id.* at 6:37-48. The written description also supports that the elevation angle and azimuth angle are associated with particular axes/coordinate systems. EX1001 at 6:37-48. ("An elevation angle from the Z axis direction is θ, and an azimuth angle in an XY coordinate is φ.").

For Ground 2, Petitioners rely on either Kurosaki and/or Alpay to disclose or render obvious limitation [1f]. However, Petitioners fail to show that Kurosaki or Alpay discloses or renders obvious limitation [1f]. Petitioners again fail to address the language of "elevation angle" and fail to provide any evidence that their alleged "incident angle" is an "elevation angle," as required by limitation [1f].

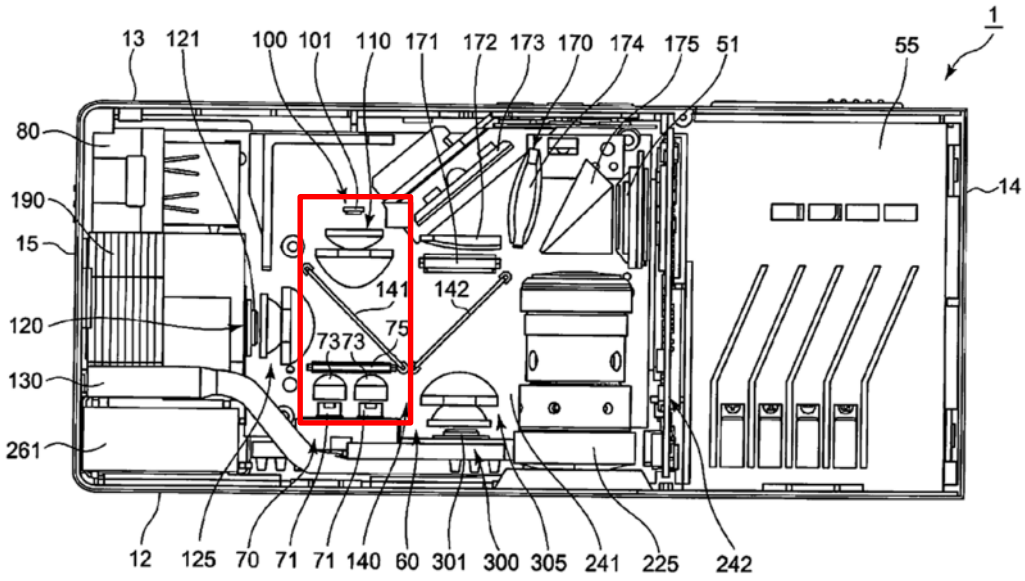
Starting with Kurosaki, when Petitioners cite Kurosaki in relation to limitation [1f], Petitioners cite an overhead view of Kurosaki:




Pet. 44 (citing annotated Figure 5 of Kurosaki). This is further shown because Figure

5 is a rudimentary diagram of a portion of Figure 3, an "exemplary ***plan*** view showing an internal construction of the projector according to the embodiment of the invention with an upper case removed." EX1012 ¶ [1016].

FIG. 3

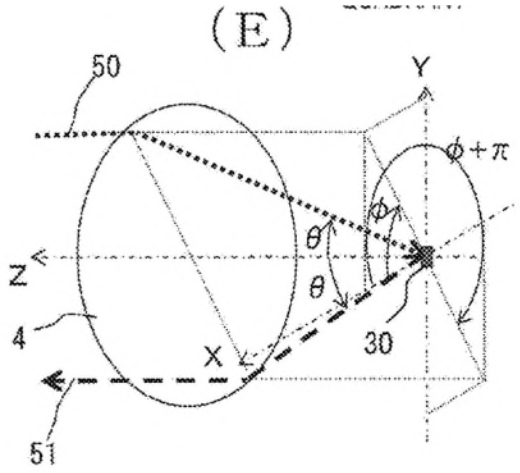



EX1012 Fig. 3 (showing top-down (plan) view, annotated to show portion of the figure corresponding to Figure 5 of Kurosaki)

A top-down, or plan, view reveals no information on an ***elevation angle*** in a similar way that a top-down view of a mountain would reveal no information on mountain elevation absent additional information (*e.g.*, contour lines, etc.). Petitioners arbitrarily mark an angle unrelated to elevation in a figure completely devoid of dimensional information that provides no elevation information, such as an elevation angle. *See* Pet. 44 (annotating a top-down view image of Kurosaki).

Petitioners provide no additional evidence or argument regarding the "***elevation*** angle" portion of the claim at all. *See id.* Pet. 43-44. Petitioners' entire analysis of Kurosaki in relation to limitation [1f] is on pages 43-44 and includes no analysis outside Petitioners' annotated Figure 5 of Kurosaki. The Petition makes no argument that an elevation angle or azimuth angle are inherently disclosed in Kurosaki.

This is in stark contrast to the disclosure of the '530 Patent regarding an elevation angle:




In FIG. 2(E), the condition for preventing the incidence of the unconverted excitation light group **51** to the excitation light source group **5** is represented by using a polar coordinate system with the excitation light irradiation region **30** as a center. An elevation angle from the Z axis direction is θ, and an azimuth angle in an XY coordinate is φ. When the excitation light group **50** enters from the Z axis direction and enters the excitation light irradiation region **30** at an incident angle

> with the elevation angle θ and the azimuth angle φ through the condensing lens **4**, the unconverted excitation light group **51** emits at an emission angle with the elevation angle θ and the azimuth angle φ+180°. Accordingly, when in the incident angle of arbitrary excitation light, the elevation angle is θm, and the azimuth angle is φm, and in the incident angle of another arbitrary excitation light, the elevation angle is θn, and the azimuth angle is φn, a mathematical formula 3 or a mathematical formula 4 is established as the condition for preventing incidence of the unconverted excitation light group **51** to the excitation light source group **5**.
>
> $\theta n \neq \theta m (\theta m \neq 0, \theta n \neq 0)$ (mathematical formula 3)
>
> $\theta n \neq \theta m + 180° (\theta m \neq 0, \theta n \neq 0)$ (mathematical formula 4)

EX1001, at 6:37-59; FIG 2(E).

Alpay fails to cure the deficiencies of Kurosaki. Petitioners state that "Alpay discloses an arrangement where an excitation light delivery subsystem is 'tilt[ed]' with respect to an excitation light irradiation system (work surface 122 in Alpay) 'so that the angle of incidence of the beam hitting the work surface is not 90 degrees.'" Pet. 44. However, Alpay explicitly states that this offset is meant to impart a "***non-vertical*** 'angle-of-attack,'" and therefore explicitly excludes a scenario with an elevation angle that is $\theta \neq 0$. EX1005 ¶ [0022] (emphasis added). In other words, Alpay is directed to a configuration in which the laser is pointed down at a work

surface and therefore fails to contemplate an elevation angle that is $\theta \neq 0$. *See, e.g.*, EX1005 Fig. 3, ¶ [0022].

With respect to Alpay, Petitioners provide no additional evidence or argument regarding the "***elevation*** angle" portion of the claim. *See id.* Pet. 43-45. The Petition makes no argument that an elevation angle or azimuth angle are inherently disclosed in Alpay. Further, as described above in Section VII.B.1, Alpay only discusses tilt in relation to avoiding a single laser's back-reflection into the single laser itself and fails to contemplate multiple lasers and what angles should be associated with multiple lasers to avoid a first laser's reflection into another laser. Therefore, a POSITA would not have been motivated to "combine the teachings of Alpay with those of Kurosaki to protect and improve the output of the light source of Kurosaki." Pet. 45. Further, Petitioners already claim that Kurosaki discloses such an offset and it is therefore unclear why a POSITA would further turn to Alpay to incorporate a feature that Petitioners already claim is present in Kurosaki. Pet. 43-44.

Petitioners fail to show a reasonable likelihood of success in establishing that claims 1 and 9 would have been obvious based on Kurosaki and Alpay.

### 3. Petitioners Fail to Establish That Claims 3, 4, and 7 Would Have Been Obvious In View of Kurosaki and Alpay

Claims 3, 4, and 7 depend on claim 1. Therefore, for at least the same reasons presented above in relation to claim 1 in Ground 2, Petitioners fail to establish that claims 3, 4, and 7 would have been obvious based on Kurosaki and Alpay. *See supra* Section VII.B.2.

Therefore, Petitioners fail to show a reasonable likelihood of success in establishing that claims 3, 4, and 7 would have been obvious based on Kurosaki and Alpay.

### 4. Petitioners Fail to Establish That Claim 9 Would Have Been Obvious In View of Kurosaki and Alpay

Claim limitation [9f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied."

Petitioners rely on the same rationale asserted in relation to limitation 1f for limitation 9f:

> Claim Element 9f is identical to Claim Element 1f. *Compare* EX1001, 20:31-37 *with id.*, 22:3-9. For the same reasons both Kurosaki and Alpay teach every limitation of Claim Element 1f, they disclose every limitation of Claim Element 9f. *See supra* Ground 2, Claim 1, Claim

Element 1f; *see also* EX1003, ¶139.

Pet. 58.

Therefore, Petitioners' rationale for Ground 2 fails for the same reasons presented above in relation to limitation [1f]. *See supra* Section VII.B.2.

### C. Ground 3: Petitioners Fail to Establish That Claim 9 Would Have Been Obvious Based on Kurosaki and Abu-Ageel

#### 1. Petitioners Fail to Establish That Claim 9 Would Have Been Obvious In View of Kurosaki and Abu-Ageel

Claim limitation [9f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied."

Petitioners rely solely on its Ground 2 rationale in relation to Kurosaki for this limitation. Pet. 65 ("As explained above, Kurosaki teaches Claim Element 9f.").

Therefore, Petitioners' rationale for Ground 3 fails for the same reasons presented above in relation to limitations [1f][4] and [9f]. *See supra* Section VII.B.2, VII.B.4.

[4] In relation to limitation [9f] in Ground 2, Petitioners relied on the same rationale provided for limitation [1f] in Ground 2.

### D. Ground 4: Petitioners Fail to Establish That Claims 1, 3, 4, and 9 Would Have Been Obvious Based on Huang and Alpay

#### 1. Petitioners Fail to Establish That Claim 1 Would Have Been Obvious In View of Huang and Alpay

Claim limitation [1f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied."

Petitioners relies on its Ground 2 rationale in relation to Alpay for this limitation:

> As explained above in the context of Ground 2, Alpay teaches the limitations of Claim Element 1f. *See supra* Ground 2, Claim 1, Claim Element 1f; EX1003, ¶167. As discussed above in the context of Claim Element 1e, a POSITA would have been motivated to combine the teachings of Alpay with those of Huang to avoid retroreflections. *See supra* Ground 2, Claim 1, Claim Element 1e; *see also* EX1003, ¶167.

Pet. 77. Therefore, Therefore, Ground 4 fails for the same reasons presented above in relation to limitations [1f]. *See supra* Section VII.B.2.

Petitioners also state:

> Further, the excitation light form sources 220 arrives to the condenser lens at an angle and focuses at the phosphor (620) that is located off of the lens axis (320); each of the light beams is shown in Figure 3B

> incident on the phosphor at an elevation angle different from zero. EX1003, ¶167.

Pet. 77.

Similar to its dependence on Kurosaki in relation to Ground 2, Petitioners rely on a top-down view of Figure 3B to disclose the elevation angle recited in limitation [1f]. However, such a top-down view would not reveal information on an "elevation angle." *See supra* Section VII.B.2. Further, there is no disclosure in Huang in Figure 3B or anywhere else that even mentions "elevation angle" and Petitioners fail to provide any such argument. *See* Pet. 77.

Therefore, Petitioners' rationale for Ground 4 fails for substantially the same reasons presented above in relation to limitation [1f]. *See supra* Section VII.B.2.

#### 2. Petitioners Fail to Establish That Claims 3 and 4 Would Have Been Obvious In View of Huang and Alpay

Claims 3 and 4 depend on claim 1. Therefore, for at least the same reasons presented above in relation to claim 1 in Ground 4, Petitioners fail to establish that claims 3 and 4 would have been obvious based on Huang and Alpay. *See supra* Section VII.D.1.

Therefore, Petitioners fail to show a reasonable likelihood of success in establishing that claims 3, 4, and 7 would have been obvious based on Kurosaki and Alpay.

### 3. Petitioners Fail to Establish That Claim 9 Would Have Been Obvious In View of Huang and Alpay

Claim limitation [9f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle θ, θ≠0 is satisfied."

Petitioners rely on the same rationale asserted in relation to limitation 1f for limitation 9f:

> Claim Element 9f is identical to Claim Element 1f. *Compare* EX1001, Col. 20:31-37 *with id.* at Cols. 22:3-9. Thus, for the same reasons Alpay teaches every limitation of Claim Element 1f, it also teaches every limitation of Claim Element 9f. *See supra* Ground 4, Claim 1, Claim Element 1f; *see also* EX1003, ¶176.

Pet. 81.

Therefore, Petitioners' rationale for claim limitation [9f] fails for the same reasons presented above in relation to limitation [1f]. *See supra* Section VII.D.1; *see also supra* Section VII.A.3.

## E. Ground 4a: Petitioners Fail to Establish That Claim 7 Would Have Been Obvious Based on Huang, Alpay, and Akiyama

Claim 7 depends on claim 1. Therefore, for at least the same reasons presented above in relation to claim 1 in Ground 4, Petitioners fail to establish that claim 7

would have been obvious based on Huang and Alpay. *See supra* Section VII.D.1.

Akiyama fails to cure the deficiencies of Huang and Alpay, and Petitioners fail to even allege so. Pet. 83-85. Petitioners only cite Akiyama in relation to dependent Claim 7.

Therefore, Petitioners fail to show a reasonable likelihood of success in establishing that Claim 7 would have been obvious based on Huang, Alpay, and Akiyama.

### F. Ground 5: Petitioners Fail to Establish That Claim 9 Would Have Been Obvious Based on Huang, Abu-Ageel, and Alpay

#### 1. Petitioners Fail to Establish That Claim Limitation [9f] Would Have Been Obvious In View of Huang, Abu-Ageel, and Alpay

Claim limitation [9f] recites: "wherein when the excitation light irradiation region is a center and an incident angle to the excitation light irradiation region of any excitation light of each of the excitation light is an elevation angle $\theta$, $\theta \neq 0$ is satisfied."

Petitioners rely solely on Alpay with respect to this limitation, and the same rationale asserted in relation to Ground 4 for Ground 5. Pet. 90 ("As explained above, Alpay teaches Claim Element 9f. EX1003, ¶195; *see also supra* Ground 4, Claim 9, Claim Element 9f.").

Therefore, Petitioners' rationale for claim limitation [9f] fails for the same reasons presented above in relation to Ground 4. *See supra* Section VII.D.3; *see also supra* Sections VII.A.3, VII.D.1.

## VIII. CONCLUSION

For at least the foregoing reasons, the Board should deny institution of the Petition.

Dated: July 7, 2025

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## CERTIFICATE OF SERVICE

I hereby certify that on this 7th day of July, 2025, a copy of the attached **PATENT OWNER'S PRELIMINARY RESPONSE** was served by electronic mail to the attorneys of record, at the following addresses:

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**CERTIFICATION PURSUANT TO 37 C.F.R. § 42.24(d)**

Pursuant 37 CFR 42.24(d), the undersigned certifies that this Preliminary Response and complies with the type-volume limitation of 37 CFR § 42.24(a). The word count application of the word processing program used to prepare this Patent Owner's Preliminary Response indicates that the Preliminary Response contains 5,409 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

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