

Petition for *Inter Partes* Review  
of U.S. Patent No. 7,678,140

DOCKET NO.: 2219905-00120US1

Filed on behalf of BOMBARDIER INC.

By: Monica Grewal, Reg. No. 40,056 (Lead Counsel)  
Jonathan P. Knight, Reg. No. 69,866 (First Backup Counsel)  
Louis Tompros (pro hac vice to be filed) (Backup Counsel)  
Xiaowei Sun, Reg. No. 80,954 (Backup Counsel)

Wilmer Cutler Pickering Hale and Dorr LLP  
60 State Street  
Boston, MA 02109  
Email: monica.grewal@wilmerhale.com

UNITED STATES PATENT AND TRADEMARK OFFICE

---

BEFORE THE PATENT TRIAL AND APPEAL BOARD

---

BOMBARDIER INC.  
Petitioner

v.

THE LITEBOOK COMPANY LTD.,  
Patent Owner

---

Case IPR2023-00192  
U.S. Patent No. 7,678,140

**PETITION FOR *INTER PARTES* REVIEW OF  
U.S. PATENT NO. 7,678,140  
CLAIMS 1-9**

## TABLE OF CONTENTS

|       |                                                                                  |    |
|-------|----------------------------------------------------------------------------------|----|
| I.    | INTRODUCTION .....                                                               | 1  |
| II.   | MANDATORY NOTICES .....                                                          | 2  |
|       | A. Real Party-In-Interest .....                                                  | 2  |
|       | B. Related Matters.....                                                          | 2  |
|       | C. Counsel .....                                                                 | 2  |
|       | D. Service Information .....                                                     | 3  |
| III.  | CERTIFICATION OF GROUNDS FOR STANDING .....                                      | 3  |
| IV.   | OVERVIEW OF CHALLENGE AND RELIEF REQUESTED .....                                 | 3  |
|       | A. Prior Art Patents and Printed Publications .....                              | 3  |
|       | B. Ground of Challenge .....                                                     | 4  |
| V.    | TECHNICAL BACKGROUND .....                                                       | 5  |
|       | A. Light Spectrum .....                                                          | 5  |
|       | B. Light Filters .....                                                           | 7  |
|       | C. Light Therapy .....                                                           | 7  |
|       | D. Light Regulation To Prevent and/or Treat a Light Responsive<br>Disorder ..... | 9  |
|       | E. Side Effects of Broad Spectrum Light Therapy .....                            | 11 |
|       | F. Light Therapy Devices .....                                                   | 11 |
| VI.   | THE '140 PATENT .....                                                            | 12 |
|       | A. Overview .....                                                                | 12 |
|       | B. Prosecution History .....                                                     | 14 |
| VII.  | LEVEL OF ORDINARY SKILL IN THE ART .....                                         | 14 |
| VIII. | CLAIM CONSTRUCTION .....                                                         | 15 |
|       | A. Plain and Ordinary Meaning Should Apply .....                                 | 15 |
| IX.   | OVERVIEW OF PRIOR ART .....                                                      | 15 |
|       | A. Weth .....                                                                    | 15 |
|       | B. Weber .....                                                                   | 18 |
|       | C. Analogous Art .....                                                           | 19 |

|      |                                                                                                    |    |
|------|----------------------------------------------------------------------------------------------------|----|
| X.   | SPECIFIC GROUNDS FOR UNPATENTABILITY .....                                                         | 20 |
| A.   | Ground I: Claims 1 and 6 Are Anticipated By Weth .....                                             | 20 |
| 1.   | Independent Claim 1 .....                                                                          | 20 |
| 2.   | Dependent Claim 6 .....                                                                            | 30 |
| B.   | Ground II: Claims 2-5 and 7-9 Would Have Been Obvious<br>Over Weth in Combination with Weber ..... | 31 |
| 1.   | Combination of Weth and Weber (“Weth-Weber”) .....                                                 | 31 |
| 2.   | Dependent Claim 2 .....                                                                            | 35 |
| 3.   | Dependent Claim 3 .....                                                                            | 36 |
| 4.   | Dependent Claim 4 .....                                                                            | 36 |
| 5.   | Dependent Claim 5 .....                                                                            | 37 |
| 6.   | Dependent Claim 7 .....                                                                            | 38 |
| 7.   | Dependent Claim 8 .....                                                                            | 38 |
| 8.   | Dependent Claim 9 .....                                                                            | 39 |
| XI.  | DISCRETIONARY DENIAL IS NOT WARRANTED.....                                                         | 39 |
| A.   | 35 U.S.C. §325(d) Does Not Favor Denial .....                                                      | 39 |
| B.   | <i>Fintiv</i> Factors Favor Institution.....                                                       | 40 |
| 1.   | The potential for a stay of the district court case urges<br>against denial (factor 1) .....       | 40 |
| 2.   | The district court trial date favors institution (factor 2) .....                                  | 41 |
| 3.   | Minimal investment in the parallel district court<br>proceeding (factor 3).....                    | 41 |
| 4.   | Remaining factors are neutral or favor institution.....                                            | 42 |
| XII. | CONCLUSION.....                                                                                    | 43 |

Bombardier Inc. (“Petitioner”) respectfully requests *Inter Partes* Review (“IPR”) of claims 1-9 of U.S. Patent 7,678,140 (the “’140 patent”) (EX1001) pursuant to 35 U.S.C. §§311-19 and 37 C.F.R. §42.1 *et seq.*

## **I. INTRODUCTION**

The ’140 patent is directed to a method of treating or preventing a light responsive disorder by exposing at least a portion of the retina of an eye to a light source that emits optical radiation to be commonly therapeutically effective in humans, using a pre-established spectral composition that has been pre-identified as maximally potent in the regulation of at least one of the human circadian, photoneural, or neuroendocrine systems. The claimed pre-established spectral composition comprises at least one peak of emitted light within the range of 435-488 nm.

But the allegedly inventive method described in the ’140 patent, including the use of visible light with a spectral peak within 435-488 nm, was well-known in the prior art. German patent application DE29618670U1 (“Weth”) anticipates claims 1 and 6 of the ’140 patent. In particular, Weth discloses a therapeutic lamp with a peak of emitted light at 438 nm, anticipating the claimed range of 435-488 nm. The remaining claims 2-5 and 7-9 are dependent claims that are directed to the use of common light filtering elements to achieve the claimed light composition. Such light filters were taught in U.S. Patent No. 6,531,230 (“Weber”), thereby rendering

obvious claims 2-5 and 7-9 when Weber is considered in combination with Weth. Accordingly, Petitioner respectfully requests cancelation of all claims of the '140 patent.

## **II. MANDATORY NOTICES**

### **A. Real Party-In-Interest**

Petitioner Bombardier Inc. and Bombardier Aerospace Corporation, NetJets Aviation, Inc., and Diehl Aerospace GmbH are real parties-in-interest.

### **B. Related Matters**

Pursuant to 37 C.F.R. § 42.8(b)(2), Petitioner states that Patent Owner ("PO") The Litebook Company Ltd. has asserted the '140 patent in *The Litebook Company Ltd. v. Bombardier Aerospace Corporation and NETJETS Aviation, INC Case No. 4:22-cv-00615* (N.D. Tex.). Petitioner states that PO has also asserted the '140 patent in *The Litebook Company Ltd. v. Verilux, Inc.*, 8:22-cv-01124 (C.D. Cal.), *The Litebook Company Ltd. v. OnePlus Technology (Shenzhen) Co., Ltd.*, 6:22-cv-00371 (W.D. Tex.), and *The Litebook Company Ltd. v. TCL Corporation et al.*, 8:21-cv-01011 (C.D. Cal.).

### **C. Counsel**

Under 37 C.F.R. § 42.8(b)(3)-(4), Petitioner identifies the following lead and backup counsel, to whom all correspondence should be directed.

Lead Counsel: Monica Grewal (Reg. No. 40,056)

Backup Counsel: Jonathan Knight (Reg. No. 69,866)

Louis Tompros (pro hac vice to be filed)

Xiaowei Sun (Reg. No. 80,954)

**D. Service Information**

Petitioner consents to electronic service at:

- monica.grewal@wilmerhale.com;
- jonathan.knight@wilmerhale.com; and
- xiaowei.sun@wilmerhale.com.

Post and hand delivery: at Wilmer Cutler Pickering Hale and Dorr LLP, 60 State Street, Boston, MA 02019, Tel: 617-526-6000, Fax: 617-526-5000.

Petitioner consents to service by e-mail on lead and backup counsel.

**III. CERTIFICATION OF GROUNDS FOR STANDING**

Petitioner certifies under 37 C.F.R. § 42.104(a) that the patent for which review is sought is available for *inter partes* review (IPR) and under 37 C.F.R. § 42.101(a)-(c) that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

**IV. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED**

Pursuant to Rules 42.22(a)(1) and 42.104(b)(1)-(2), Petitioner challenges claims 1-9 of the '140 patent.

**A. Prior Art Patents and Printed Publications**

The '140 patent was filed claiming priority to a provisional application no. 60/203,308, filed on May 10, 2000, and provisional application no. 60/228,493, filed

on Aug. 28, 2000.

The following references are pertinent to the grounds of unpatentability explained below:<sup>1</sup>

- German Patent No. DE29618670U1 (“Weth”) (EX1004<sup>2</sup>), published October 23, 1997, is prior art under at least 35 U.S.C. §§ 102(a)-(b).
- U.S. Patent No. 6,531,230 (“Weber”) (EX1022), filed on January 13, 1998 and published on March 11, 2003, is prior art under at least 35 U.S.C. §§ 102(e).

EX1005, ¶¶24-25.

## **B. Ground of Challenge**

Petitioner requests cancellation of claims 1-9 of the ’140 patent as unpatentable under 35 U.S.C. §§ 102, 103. The grounds for challenge are

| Ground | References     | Basis | Claims Challenged |
|--------|----------------|-------|-------------------|
| I      | Weth           | § 102 | 1, 6              |
| II     | Weth and Weber | § 103 | 2-5, 7-9          |

---

<sup>1</sup> The effective filing date of the ’140 patent is no later than May 10, 2001, the date on which it was filed, which is before the effective date of the America Invents Act (AIA). Accordingly, Petitioner applies the pre-AIA statutory framework.

<sup>2</sup> Citations to Weth refer to a certified translation of Weth in EX1004.

This Petition, supported by the declaration of Dr. Craig Heller (EX1005), demonstrates there is a reasonable likelihood that the Petitioner would prevail with respect to at least one challenged claim. 35 U.S.C. § 314(a). Petitioner respectfully requests institution. *SAS Institute Inc. v. Iancu*, 138 S. Ct. 1348 (2018).

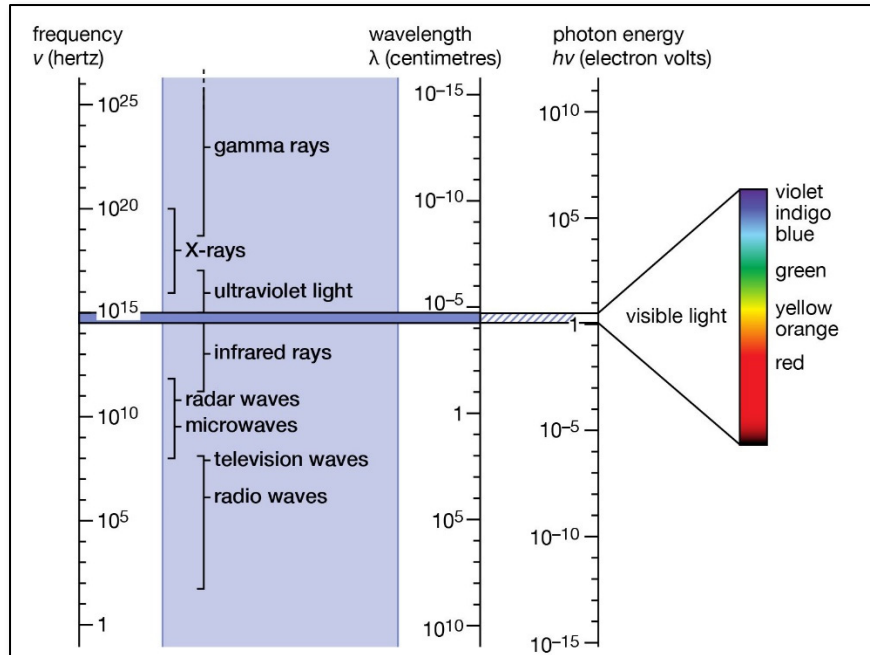
## V. TECHNICAL BACKGROUND

### A. Light Spectrum

The method claimed in the '140 patent requires “utilizing at least one light source emitting **optical radiation**”<sup>3</sup> for “regulation of at least one of the human circadian, photoneural, or neuroendocrine systems.” EX1001, claim 1. **Optical radiation** is the propagation of electromagnetic waves with wavelengths in the range of approximately 100 nanometers (nm) to 1 millimeter (mm), inclusive of the ultraviolet (UV), visible, and infrared components of the electromagnetic spectrum. EX1030, 16; EX1031, 539. Ultraviolet radiation includes wavelengths in the range of 100 nm to 400 nm, which are not visible to the human eye. EX1030, 16. Visible light is that portion of the electromagnetic spectrum which can be perceived by the human eye. EX1006, 10.

---

<sup>3</sup> All annotations and emphases in this petition have been added unless noted otherwise.



EX1009, 1. EX1005, ¶27.

The visible spectrum consists of light with wavelengths in the range of approximately 400 nm to 700 nm that may be subdivided into a family of colors corresponding to the following approximate wavelength ranges, however the spectrum is a continuous function of wavelengths and not a collection of discrete bands as assigned subjectively to specific colors:

- **violet** 400 nm to 450 nm;
- **blue**: 450 nm to 500 nm;
- **cyan**: 500 nm to 550 nm
- **green**: 550 nm to 580 nm;
- **yellow**: 580 nm to 600 nm;

- **orange**: 600 nm to 650 nm; and
- **red**: 650 nm to 700 nm.

EX1003, 2. EX1005, ¶28.

## **B. Light Filters**

A light filter selectively transmits light in a particular range of wavelengths. EX1006, 53. Light filters that existed long before the earliest effective filing date of the '140 patent include absorption filters, which selectively absorb particular wavelengths or ranges of wavelengths (*id.*), and interference filters, which reflect unwanted wavelengths. *Id.* More than one year before the earliest effective filing date of the '140 patent, a person of ordinary skill in the art (“POSITA”) knew that a light filter could be made transparent or translucent, depending on the choice of materials used for its construction. EX1006, 53. EX1005, ¶29.

## **C. Light Therapy**

Therapies involving exposure of a subject to light were well known long before the earliest filing date of the '140 patent. EX1006, 1; EX1007, 3. For example, exposure of the human retina to light was shown in the 1980's to be an effective therapy for seasonal affective disorder, depression, sleep disorders, and circadian disruption. EX1001, 3:48-55; EX1008, 245; EX1013 [Wirz-Justice],

195.<sup>4</sup> In 1969, Aschoff and coworkers first showed that specific patterns and timings of light exposure can be employed to correct circadian rhythm dysfunctions. EX1026, 58. Since then and prior to the filing date of the '140 patent, many physiological conditions have been shown to be influenced by circadian disruption and therefore treatable by light therapy that can normalize those circadian rhythms. EX1027, 105-108. For example, melanopsin, a nonvisual opsin that is expressed in the retina, has been shown to mediate regulation of the circadian rhythm and suppression of pineal melatonin rather than contributing to vision formation. EX1028, 600, 604. EX1005, ¶30.

It was also well understood that ocular exposure to light of different colors (which have different wavelengths) would potentially cause different effects on melatonin secretion, a hormone that plays an important role in regulating circadian rhythm. EX1023, 667. For example, blue and green light—specifically, light exhibiting spectral peaks of 430 nm and 540 nm, respectively—were known to suppress melatonin at night. *Id.*, 667-668. EX1005, ¶31.

---

<sup>4</sup> Wirz-Justice was publicly accessible to and would have been referred to by a POSITA prior to the earliest priority date of the '140 patent. *See* EX1024, ¶65.

**D. Light Regulation To Prevent and/or Treat a Light Responsive Disorder**

At least a decade before the earliest effective filing date of the '140 patent, a POSITA understood that the exposure of a subject's eyes to optical radiation was the primary stimulus for regulating circadian rhythms, seasonal cycles, and neuroendocrine system responses in many mammals, including humans. EX1010 [Lewy], 1267.<sup>5</sup> EX1005, ¶32.

Circadian rhythms generated by the body's internal clock in the brain—the suprachiasmatic nucleus through neurochemical systems—regulate many aspects of physiology. EX1032, 5. Light received by the retinas of the eyes have direct effects on the suprachiasmatic nucleus and therefore on any physiological systems, including the sleep-wake cycle that are controlled by the circadian system through, in part, the release of the neurochemical melatonin. EX1027, 105-106; EX1011, 667; EX1010, 1267. Dopamine, a neurotransmitter made in the brain, also influences sleep-wake which Weth states is regulated by the light composition produced by its lamp. EX0133, 1; EX1032, 8-9, 12; *see* Section X.A.1 [claim 1]. Dopamine influences other bodily functions including memory, pleasure, motivation, attention, and mood. EX1033, 1-3; EX1034, 518. EX1005, ¶33.

---

<sup>5</sup> Lewy was publicly accessible to and would have been referred to by a POSITA prior to the earliest priority date of the '140 patent. *See* EX1024, ¶65.

A POSITA understood that light therapy was effective for treating seasonal affective disorders, sleep problems, and circadian disruptions. EX1011, 667 (sleep disorders may be treated using properly-timed exposure to bright light); EX1012, 2:30-3:22 (jet lag may be prevented by restricting exposure to certain wavelengths of light). In particular, light was shown to regulate the human circadian rhythm through melatonin, a hormone whose secretion is suppressed by light. EX1010, 1267; EX1023, 669 (green and blue lights had been shown to inhibit nocturnal melatonin secretion). EX1005, ¶34.

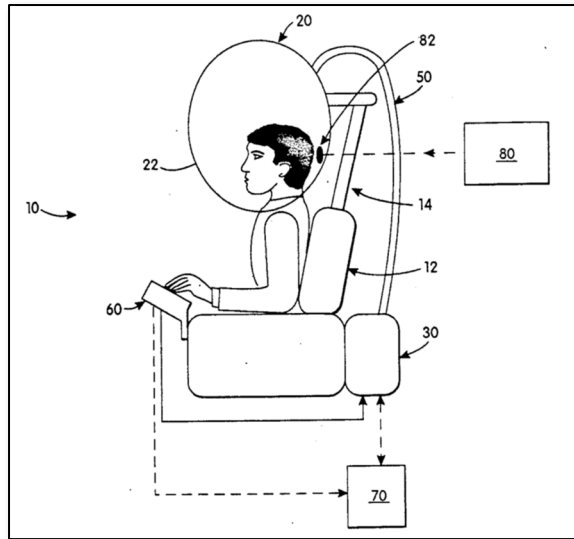
Moreover, before the earliest effective filing date of the '140 patent, a POSITA knew that increased physiological response could be triggered by specific ranges of wavelengths. *See, e.g.*, EX1016, 564 (“melatonin suppression is more sensitive to the middle wavelengths of light (green) as opposed to the longer (red) ... wavelengths.”); EX1023, 669 (the green and blue lights were shown to have a greater inhibitory effect on nocturnal melatonin secretion than the yellow and red light). For example, short to medium wavelength (blue, green, and yellow) components of broad spectrum light were shown to account for the therapeutic effect of broad spectrum light on seasonal affective disorder. EX1015, 117; *see also* EX1014, 476 (blue light found more potent than full-spectrum light in treatment of neonatal jaundice). EX1005, ¶35.

**E. Side Effects of Broad Spectrum Light Therapy**

Before the earliest effective filing date of the '140 patent, a POSITA also knew that specific ranges of wavelengths within a broad spectrum of light triggered potentially undesirable side effects. *See, e.g.*, EX1013, 200. For example, yellow light including wavelengths in the approximate range of 580 nm to 600 nm which has peaks at 540 nm and 580-590 nm within broad spectrum light, triggers headache, nausea, agitation and irritability. *Id.* EX1005, ¶36.

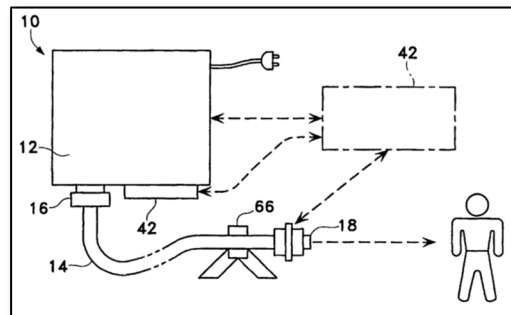
**F. Light Therapy Devices**

Before the earliest effective filing date of the '140 patent, a POSITA was aware of devices configured to prevent and/or treat disorders through ocular exposure to light (either broad spectrum or narrow band). For example, the light device disclosed in U.S. Patent No. 5,047,006 (EX1018) uses a reclining chair equipped with a light source to provide a field of broad spectrum light for mental and physical therapy:



EX1018, FIG. 1, Abstract. EX1005, ¶37.

Likewise, U.S. Patent No. 5,849,027 (EX1019) describes a non-contact system for delivering designated light wavelengths to a patient's body:



EX1019, FIG. 1, Abstract. EX1005, ¶37.

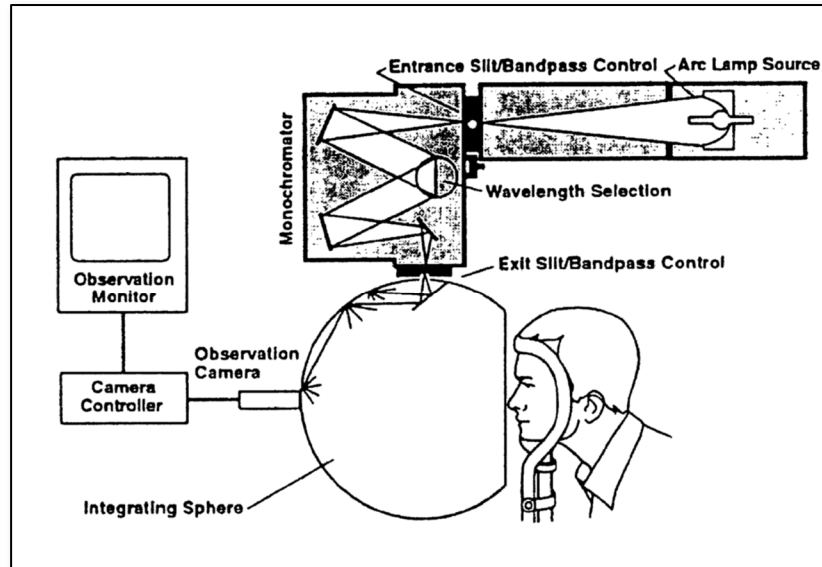
## VI. THE '140 PATENT

### A. Overview

The '140 patent “generally relates to the fields of neurology, neuroscience, endocrinology and to light systems, light meters, lamps, filters, transparent and translucent materials, and methods of treating a variety of mammalian disorders and,

more particularly to a light system for stimulating or regulating neuroendocrine, circadian, and photoneural systems in mammals.” EX1001, 1:27-33, Abstract. According to the ’140 patent, it was well-known in the prior art that “[l]ight is the primary stimulus for regulating circadian rhythms, seasonal cycles, and neuroendocrine responses in many species including humans.” *Id.*, 1:48-50. EX1005, ¶¶44-45.

The purported invention as described in the ’140 patent is allegedly “based upon the discovery of” using light with a “peak sensitivity ranging from 425-505 nm” (EX1001, 1:33-34) for the treatment of “a wide variety of light responsive disorders ... [such as] light responsive disorders, eating disorders, menstrual cycle disorders, non-specific alerting and performance deficit, hormone-sensitive cancers, and cardiovascular disorders.” EX1001, 9:12-16, 1:40-44. The ’140 patent further provides “a light system for stimulating or regulating neuroendocrine, circadian, and photoneural systems in mammals.” *Id.*, 1:31-33. For example, Figure 5 of the ’140 patent provides an “experimental electronic, optic and ganzfeld dome exposure array” (*Id.*, 9:51-52) that provides “light stimuli” into the eyes of a subject without the need to mount the system to the body of the subject. *Id.*, 14:62-64.



EX1001, FIG. 5. EX1005, ¶46.

## B. Prosecution History

The '140 patent was filed as Application No. 09/853,428 on May 10, 2001, and claims priority to Provisional Application No. 60/203,308, filed on May 10, 2000 (EX1021, the “308 provisional application”) and Provisional Application No. 60/228,493, filed on August 28, 2000 (EX1020, the “493 provisional application”).

EX 1001, Cover. EX1005, ¶47.

## VII. LEVEL OF ORDINARY SKILL IN THE ART

At the time of the claimed priority dates (May 10, 2000, and August 28, 2000) and the filing date of the application for the '140 patent (May 10, 2001), a POSITA would have had at least a Ph.D. or M.D., with a background in circadian biology,

neuroscience, physiology, and phototherapy, or at least 5 years of professional experience in one or more of those fields. EX1005, ¶¶38-41.

## **VIII. CLAIM CONSTRUCTION**

### **A. Plain and Ordinary Meaning Should Apply**

The challenged claims of the '140 patent are construed “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. § 282(b).” 37 C.F.R. § 42.100(b) (Nov. 13, 2018). For purposes of the issues raised in this Petition, Petitioner submits that each claim term should be given its plain and customary meaning as understood by a POSITA, in accordance with *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). If Patent Owner, seeking to avoid the prior art, offers a specific construction or interpretation, Petitioner reserves the right to respond. EX1005, ¶¶42-43.

## **IX. OVERVIEW OF PRIOR ART**

### **A. Weth**

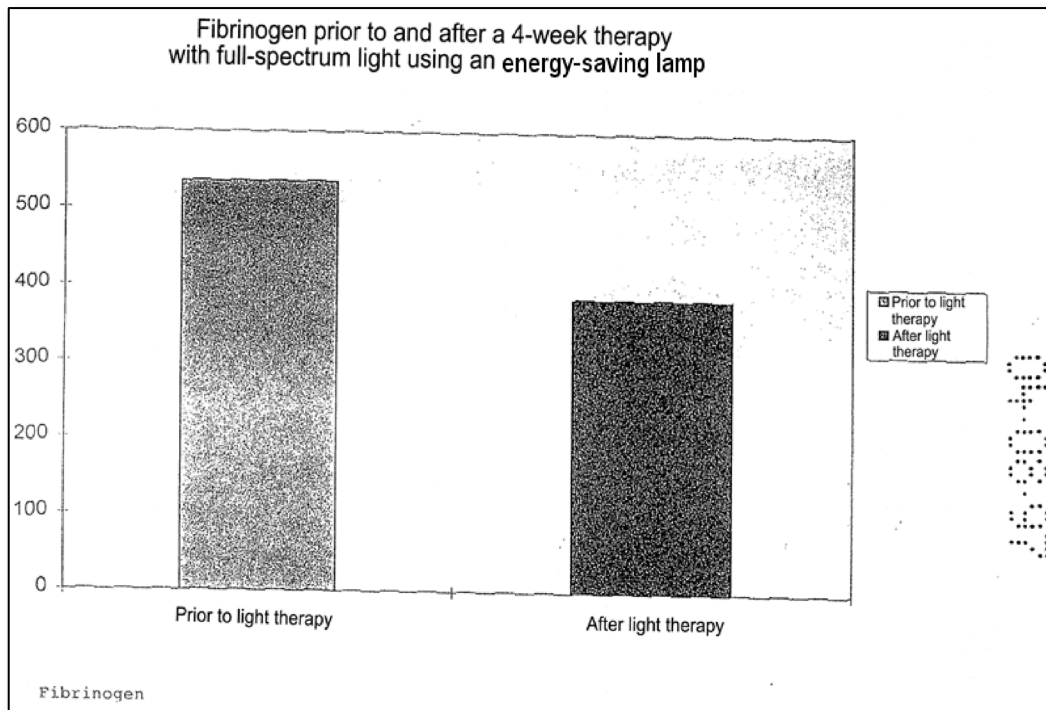
Weth discloses an “energy-saving lamp” that produces a custom light composition for “therapeutic purposes and/or illumination purposes.” EX1004 [Weth], 1:3-6. The disclosed light spectrum comprises broad spectrum light and one or more spectral peaks in UV and in the visible range (*id.*, 2:34-36, 3:13-20, 18:14-19) that is “very close to sunlight” and “differs fundamentally from the light spectrum of conventional daylight lamps.” *Id.*, 2:19-26. Because the broad spectrum component of the light emitted by the lamp “largely correspond[s] to

insolation [*i.e.*, exposure to sunlight],” such light is “substantially more pleasant to the eye” than the light spectrum of conventional lamps. *Id.*, 5:8-17, 18:14-19. Furthermore, fewer lamps are required to achieve a given level of illumination. *Id.*, 5:8-17. EX1005, ¶48.

Weth attributes the therapeutic and preventative effects of its light composition to one or more spectral peaks in both the UV and visible spectrum (EX1004 [Weth], 1:32-2:17, 3:13-4:13) including peaks at 251 nm, 265 nm, 290 nm, 319 nm, 335 nm, 368 nm, 380 nm, 410 nm, 438 nm, 490 nm, 515 nm, 540 nm, 580 nm, 610 nm, 650 nm, and 690 nm, which “correspond to the absorption lines of the [] endogenous, essential substances.” *Id.* EX1005, ¶49.

Weth’s light composition is effective for treating and preventing light responsive disorders such as disorders of the coagulation system, arteriosclerosis, myocardial infarctions and acute strokes, osteoporosis metabolism, depression, exanthemata, psychoses. EX1004 [Weth], 1:3-6, 5:19-6:34. In particular, similar to the light responsive disorders such as “seasonal affective disorders, sleep disorders, circadian disruption, [] hormone-sensitive cancers [], and cardiovascular disorders” as described in the ’140 patent (EX1001, 8:44-50), Weth describes utilizing its energy-saving lamp for “improv[ing] [the] quality of sleep,” (EX1004 [Weth], 12:34-35) “avoidance of myocardial infarctions and strokes,” (*id.*, 5:19-30) “reduction in embolisms and thromboses,” (*id.*, 5:27-30) “prevent[ing] diseases

caused by coagulation disorders,” (*id.*, 5:37-6:3) and “lead[ing] to significant improvement in [overcoming depression].” *Id.*, 13:25-30. For example, Weth reports that 110 patients with coronary artery disease (CAD) were treated with “a twice daily half-hour irradiation” to the light from the energy-saving lamp for four weeks. *Id.*, 6:33-7:9. As shown in the graph on page 22 of Weth, the fibrinogen level (an increased level of fibrinogen is attributable to CAD) dropped from 543 mg/dl before the treatment to 389 mg/dl following the treatment. *Id.*, 6:24-25, 6:33-7:9 (page 22). EX1005, ¶50.

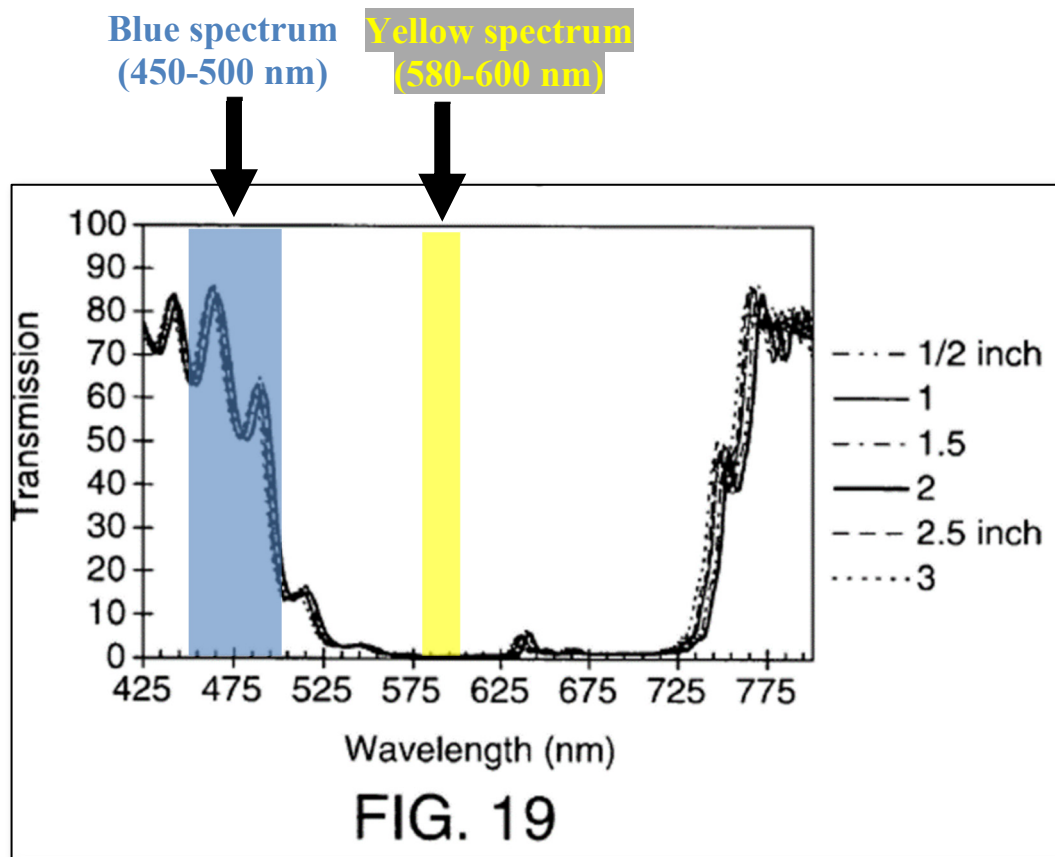


Similar to the '140 patent's disclosure in claim 1 to “expos[e] at least a portion of the retina of at least one eye” to the therapeutic light, Weth states that it is

“important ... that the [therapeutic] effect can be obtained purely by way of the eyes.” EX1004 [Weth], 7:34-36. Weth’s light therapy obviates the need for the “[w]hole-body irradiation, like in the case of the previously known therapies.” *Id.*, 7:36-38. Eye exposure to the disclosed light composition results in an “[i]mprovement in the receptor sensitivity” and therefore “quality of sleep” improves. *Id.*, 12:30-37. Weth’s lamp is used “both as a tabletop lamp and as a ceiling lamp,” rather than as part of an apparatus configured to be attached to the body of a subject. *Id.*, 2:24-26. EX1005, ¶¶51-52.

## **B. Weber**

Weber discloses multilayer optical films that function as simple color filters. EX1022 [Weber], 19:21-31. In particular, Weber’s color filters are “useful for concentrating light of the desired wavelengths” that “may be combined with artificial broadband light sources to control the wavelength of light emitted from the source.” *Id.*, 94:41-45. For example, Weber’s Figure 19 (reproduced below) shows a transmission spectrum which allows high transmission of over 50% for wavelengths of approximately 435 nm to 500 nm (inclusive of the blue spectrum of light) while filtering out more than 90% of the light intensity in the spectrum range of between 525 nm and 725 nm (inclusive of the yellow spectrum of light). Weber’s filter transmits light in the UV spectrum unless specially configured with “UV stabilized films or coatings.” *Id.*, 79:35-49.



EX1022 [Weber], FIG. 19 (annotated). EX1005, ¶53.

### C. Analogous Art

Weth and Weber are analogous art and/or reasonably pertinent to the problem faced by the inventor of the '140 patent. *In re Bigio*, 381 F.3d 1320, 1325 (Fed. Cir. 2004). For example, Weth and the '140 patent are both directed to “treatment of mammals with a wide variety of disorders or deficits, including light responsive disorders.” EX1001, Abstract. *See* EX1004 [Weth], 1:5-6, 5:19-34, 8:36-9:8. Weber is directed to the use of light filters to control wavelengths present in a transmitted light spectrum and therefore, at a minimum, would have been considered

by a POSITA to disclose relevant teachings to consider when faced with the problem of implementing a selected light composition in accordance with the claimed invention of the '140 patent. *See* EX1022 [Weber], 6:31-33, 11:20-30, 85:57-62. EX1005, ¶54.

## **X. SPECIFIC GROUNDS FOR UNPATENTABILITY**

Pursuant to Rule 42.104(b)(4)-(5), the following sections (as confirmed in Dr. Heller's Declaration ¶¶55-93 (EX1005)) detail the grounds of unpatentability, the limitations of challenged claims 1-9 of the '140 patent, and how these claims were therefore anticipated or obvious in view of the prior art.

### **A. Ground I: Claims 1 and 6 Are Anticipated By Weth**

#### **1. Independent Claim 1**

- a. Element [1-pre]: “*A method of at least treating or preventing at least one light responsive disorder in at least one mammal, said method comprising the steps of:*”**

To the extent the Board treats element [1-pre] as limiting, Weth discloses element [1-pre]. For example, Weth discloses “an energy-saving **lamp for therapeutic purposes**” that is used for influencing “the fibrinogen level, **arteriosclerosis**, immunological diseases, psychoses, **depressions** and further **diseases**” and for “**avoidance of myocardial infarctions and strokes.**” EX1004 [Weth], 1:3-6, 5:19-6:34. *See also id.*, 19:3-7 [claim 1]. The electromagnetic radiation from the disclosed lamp is found to “yield a **reduction in embolisms and**

**thromboses**” and for “**prevent[ion of]** diseases caused by coagulation disorders.” *Id.*, 5:19-6:34. *See also id.*, 8:36-9:8 (controlling tumor necrosis factors, interleukins, and prostaglandins). Weth’s lamp is useful for preventing light responsive disorders. For example, a tabletop lamp or ceiling lighting unit may be used for “**completely prevent[ing]** the **aforementioned diseases**” or as a “**prophyla[ctic]**” measure. *Id.*, 9:4-8, 10:18-26. EX1005, ¶¶58-60.

**b. Element [1a]: “utilizing at least one light source, said at least one light source emitting optical radiation”**

Weth discloses element [1a]. Weth’s “**energy saving lamp**” is an example of “*at least one light source.*” EX1004 [Weth], cover (title “Energy-saving lamp for medical therapies”), 1:5-6 (“energy-saving lamp for therapeutic purposes and/or illumination purposes”), 2:24-26 (lamp can be “used both as a **tabletop lamp and as a ceiling lamp** for the purposes of avoiding disease and increasing the well-being and performance”), 19:17-18 [claim 3] (“**space saving lamp**”). *See* Section IX.A [Overview of Weth]. EX1005, ¶61.

Furthermore, Weth’s lamp “*emit[s] optical radiation*” comprising ultraviolet radiation and visible light. *See* Section V.A [Technical Background—Light Spectrum] (optical radiation comprises ultraviolet radiation and visible light). Specifically, Weth’s lamp emits **ultraviolet radiation** “including the following spectral lines: 251 nm ( $\pm 5$  nm), 265 nm ( $\pm 15$  nm), 290 nm ( $\pm 15$  nm), 319 nm ( $\pm 10$  nm), 335 nm ( $\pm 15$  nm), 368 nm ( $\pm 15$  nm).” EX1004 [Weth], 1:32-36, 19:3-7 [claim

1]. See Section V.A [Technical Background—Light Spectrum] (ultraviolet radiation consists of wavelengths in the range of approximately 100 nm to 400 nm). And, in a “particularly preferred embodiment,” Weth’s lamp also emits **visible light** including “at least one spectral line of the following group: ... 410 nm ( $\pm 15$  nm), 438 nm ( $\pm 15$  nm), 490 nm ( $\pm 15$  nm), 515 nm ( $\pm 15$  nm), 540 nm ( $\pm 15$  nm), 580 nm ( $\pm 15$  nm), 610 nm ( $\pm 15$  nm), 650 nm ( $\pm 15$  nm), [and] 690 nm ( $\pm 15$  nm).” EX1004 [Weth], 3:13-20, 19:9-15 [claim 2]. See Section V.A [Technical Background—Light Spectrum] (visible light consists of wavelengths in the range of 400-700 nm). EX1005, ¶62.

- c. **Element [1b]: “causing said optical radiation to be commonly therapeutically effective in humans by employing a pre-established spectral composition that has been pre-identified as a maximally potent spectral composition in the regulation of at least one of the human circadian, photoneural, or neuroendocrine systems, said pre-established spectral composition comprising at least one enhanced spectral region comprising at least one peak of emitted light within the range of 435-488 nm;”**

Weth teaches element [1b]. EX1005, ¶63.

- 1) **“causing said optical radiation to be commonly therapeutically effective in humans”**

Weth discloses “causing said optical radiation.” For example, Weth’s “lamp” is **used in common human settings** such as “schools, hospitals, especially in ICUs, prisons and nurseries as we found out that the well-being of both the

patients and the staff improves” (EX1004 [Weth], 3:7-11) and “can be screwed into any illuminant socket.” *Id.*, 2:28-29. *See also id.*, 2:24-26 (lamp can be “used both as a **tabletop lamp and as a ceiling lamp** for the purposes of avoiding disease and increasing the well-being and performance”), 19:17-18 [claim 3] (“space saving lamp”). Furthermore, Weth causes the optical radiation to be used by making the “illuminant ... substantially more pleasant than that of conventional luminaires.” *Id.* 5:1-3. *Id.*, 5:8-11 (“the novel light spectrum of the energy-saving lamp ... is substantially more pleasant to the eye than the spectrum of conventional illuminants”). EX1005, ¶64.

Weth further discloses “*commonly therapeutically effective in humans.*” For example, the lamp provides a light composition designed “for **therapeutic purposes**” (EX1004 [Weth], 1:5-6) including “**medical therapies.**” *Id.*, Cover, 19:3-7 [claim 1] (“Energy-saving lamps for therapeutic purposes ....”). Human “**patients** have significantly improved clinical findings ... as a result of using the energy-saving lamp according to the invention.” *Id.*, 7:31-34. An investigation of 110 patients found “a drop in the fibrinogen level as a result of the treatment with the energy-saving lamp” (*id.*, 6:33-38) while the “[e]xtent and severity of coronary sclerosis correlate significantly with the value of the fibrinogen level.” *Id.*, 11:12-13. *See also id.*, 1:32-36 (illuminant for therapeutic purposes comprising optical radiation of “the following spectral lines: 251 nm ( $\pm 5$  nm), 265 nm ( $\pm 15$  nm), 290

nm ( $\pm 15$  nm), 319 nm ( $\pm 10$  nm), 335 nm ( $\pm 15$  nm), 368 nm ( $\pm 15$  nm).”), 8:10-14 (“Therapeutic effects comparable to those obtained using the energy-saving lamp according to the invention could not be obtained previously. Moreover, many new clinical effects, not known before, arose as a result of using the energy-saving lamp according to the invention.”), 8:31-9:2 (“One of the most important detection parameters includes the immunological measured values, starting from the erythrocyte sedimentation rate up to the sensitively reacting CRP (C-reactive protein) and in the case of electrophoresis. The tumour necrosis factors, the interleukins, the prostaglandins, etc. are also influenced. All of these parameters are influenced positively by way of this lamp light.”), 11:36-12:28 (therapy for acute myocardial infarctions and acute strokes), 12:30-37 (improved receptor sensitivity), 13:1-12 (improved Vitamin D formation), 13:14-21 (improved low-density lipoprotein concentration), 13:23-35 (improved Hamilton Rating Scale parameters for depression), 13:37-14:9 (improved stimulation of immune system), 14:11-24 (reduction in C-reactive protein associated with chronic fatigue syndrome), 14:26-15:3 (significantly improved activity of daily life (ADL) status), 15:5-10 (increased interferon levels), 15:12-17 (stimulation of hypophysis hormones and suppression of appetite), 15:19-27 (treatment of skin exanthemata), 15:29-38 (regression in the paranoid symptoms), 16:1-7 (prevention of pathological amino acids). EX1005, ¶65.

2) ***“by employing a pre-established spectral composition that has been pre-identified as a maximally potent spectral composition,”***

Weth discloses “*by employing a pre-established spectral composition that has been pre-identified as a maximally potent spectral composition.*” EX1005, ¶66.

For example, Weth discloses that its lamp produces a “*pre-established spectral composition*” including “the following **spectral lines**: 251 nm ( $\pm 5$  nm), 265 nm ( $\pm 15$  nm), 290 nm ( $\pm 15$  nm), 319 nm ( $\pm 10$  nm), 335 nm ( $\pm 15$  nm), 368 nm ( $\pm 15$  nm)” (EX1004 [Weth], 1:34-36) and “380 nm ( $\pm 15$  nm), 410 nm ( $\pm 15$  nm), 438 nm ( $\pm 15$  nm), 490 nm ( $\pm 15$  nm), 515 nm ( $\pm 15$  nm), 540 nm ( $\pm 15$  nm), 580 nm ( $\pm 15$  nm), 610 nm ( $\pm 15$  nm), 650 nm ( $\pm 15$  nm), 690 nm ( $\pm 15$  nm), 710 nm ( $\pm 15$  nm), 740 nm ( $\pm 15$  nm), 770 nm ( $\pm 15$  nm), 800 nm ( $\pm 15$  nm).” *Id.*, 3:16-20. *See also id.*, 19:3-15 [claims 1 and 2]. *See also id.*, 1:19-21, 2:19-26 (spectral composition “very close to sunlight” and “differs fundamentally from the light spectrum of conventional daylight lamps”), 2:34-36, 3:13-20, 18:14-19. EX1005, ¶66.

Furthermore, Weth’s spectral composition is a “*maximally potent spectral composition*” for therapy because the spectral composition is specifically set to correspond to a subject’s “**absorption lines of**” “**endogenous, essential substances**” (i.e., the subject’s light sensitive substances). EX1004 [Weth], 3:22-4:13 (“these spectral lines correspond to the absorption lines of the ... **endogenous, essential substances.**”). *Id.*, 12:30-37 (“[i]mprovement in receptor sensitivity”). By

tuning the spectral compositions to a subject's light response mechanism, the composition is "*maximally potent.*" See, e.g., EX1001, 4:9-16 (characterizing the "wavelength sensitivity of the photoreceptor system responsible for providing circadian input to the human pineal gland" of 446 nm to 477 nm as the "most potent wavelength region for regulating melatonin."). As a result, the spectral composition is effective for "vigilance increases" and "improv[ing] the quality of sleep" (EX1004 [Weth], 12:30-37), "avoidance of myocardial infarctions and strokes" (*id.*, 5:19-25) "reduction in embolisms and thromboses" (*id.*, 5:27-30), "prevent[ing] diseases caused by coagulation disorders" (*id.*, 5:37-6:3) and "lead[ing] to significant improvement in [overcoming the depression]." *Id.*, 13:25-30. EX1005, ¶67.

3) ***"in the regulation of at least one of the human circadian, photoneural, or neuroendocrine systems,"***

Weth discloses "*in the regulation of at least one of the human circadian, photoneural, or neuroendocrine systems.*" For example, Weth's lamp "leads to an **increase in the dopamine level**, that is to say vigilance increases" and also "**improves quality of sleep.**" EX1004 [Weth], 12:32-35. As explained in Section V.D [Technology Background—Light Regulation To Prevent and/or Treat a Light Responsive Disorder], the wake-sleep cycle is part of the circadian rhythm and dopamine is an example of a neurotransmitter that is known to influence sleep. Thus,

Weth teaches a spectral composition “*in the regulation of ... the human circadian ... or neuroendocrine system*[/].” EX1005, ¶68.

- 4) **“*said pre-established spectral composition comprising at least one enhanced spectral region comprising at least one peak of emitted light within the range of 435-488 nm;*”**

Weth discloses “*said pre-established spectral composition comprising at least one enhanced spectral region comprising at least one peak of emitted light within the range of 435-488 nm.*” For example, Weth’s lamp emits “**at least one spectral line** of the following group: ... **438 nm** ( $\pm 15$  nm).” EX1004 [Weth], 19:9-15 [claim 2]. Weth’s at least one spectral line is “*at least one enhanced spectral region comprising at least one peak of emitted light*” because it is at least one line distinct and discernable from other parts of the spectrum (for example uniform or continuous parts of the spectrum) emitted from Weth’s lamp. Moreover, the spectral line 438 nm falls within the range of 435-488 nm. EX1005, ¶69.

- d. **Element [1c]: “*exposing at least a portion of the retina of at least one eye of at least one mammal to said pre-established spectral composition of optical radiation such that said light source is not mounted on the body of said at least one mammal;*”**

Weth discloses “*exposing at least a portion of the retina of at least one eye of at least one mammal*” because Weth’s lamp is for both “therapeutic purposes and/or **illumination** purposes.” EX1004 [Weth], 1:3-6. Weth further explains that “light from the energy-saving lamp according to the invention **enters the eyes of the**

**observer** when the latter looks at an image displayed by means of the cathode-ray tube.” *Id.*, 9:21-24. *See also id.*, 2:24-26, 19:17-18. By providing illumination and entering the eyes, Weth requires “*exposing at least a portion of the retina*” of one of the eyes to its pre-established spectral composition. EX1005, ¶70.

Moreover, Weth teaches that a therapeutic effect is “**obtained purely by way of the eyes**. Whole-body irradiation, like in the case of the previously known therapies, thus is no longer required.” EX1004 [Weth], 7:34-38. Thus, Weth requires “*exposing at least a portion of the retina*” of one of the eyes to its pre-established spectral composition, and such exposure is inherent based on the therapeutic benefits described by Weth, including “fibrinogen level, arteriosclerosis, immunological diseases, psychoses, depressions and further diseases to be influenced” (*id.*, 5:19-25) and stimulation of Vitamin D formation. *Id.*, 13:1-12. *See also id.*, 1:32-36, 8:10-14, 8:31-9:2, 11:12-13, 11:36-12:28, 12:30-37, 13:14-21, 13:23-35, 13:37-14:9, 14:11-24, 14:26-15:3, 15:5-10, 15:12-17, 15:19-27, 15:29-38, 16:1-7. *See* Section X.A.1.C.2 [element [1b]]. *See* EX1017, 1 (retina is a complex transparent tissue in the eye, which contains a layer of light-sensitive photoreceptor cells). EX1005, ¶71.

Weth discloses “*said pre-established spectral composition of optical radiation such that said light source is not mounted on the body*.” For example, Weth’s lamp is “used both as a **tabletop lamp and as a ceiling lamp** for the

purposes of avoiding disease and increasing the well-being and performance.”

EX1004 [Weth], 2:24-26. Therefore, Weth discloses a light source that is not mounted on the body of a subject. EX1005, ¶72.

e. **Element [1d]: “*stimulating the photoreceptor system for at least one of the circadian, photoneural or neuroendocrine systems of said at least one mammal;*”**

Weth discloses element [1d]. Weth discloses “*stimulating the photoreceptor system*” because the therapeutic effect of its lamp is “obtained **purely by way of the eyes.**” EX1004 [Weth], 7:34-37. *See* Section X.A.1.d [element [1c]]; EX1017, 1 (retina is a complex transparent tissue in the eye, which contains a layer of light-sensitive photoreceptor cells). EX1005, ¶73.

Moreover, the stimulation is “*for at least one of the circadian, photoneural or neuroendocrine systems of said at least one mammal*” because Weth’s lamp “leads to an increase in the dopamine level, that is to say vigilance increases” and also “improves quality of sleep.” EX1004 [Weth], 12:32-35. As explained in Section V.D [Technology Background—Light Regulation To Prevent and/or Treat a Light Responsive Disorder], the wake-sleep cycle is part of the circadian rhythm and dopamine is an example of a neurotransmitter that is known to influence sleep. *See also* Section X.A.1.c [element [1b]]. EX1005, ¶74.

f. **Element [1e]: “enabling at least the treatment or the prevention of at least one light responsive disorder in said at least one mammal.”**

Weth discloses “enabling at least the treatment or the prevention of at least one light responsive disorder in said at least one mammal.” As explained in Section X.A.1.a [element [1-pre]], Weth’s lamp treats light responsive disorders by enabling “fibrinogen level, arteriosclerosis, immunological diseases, psychoses, depressions and further diseases to be influenced,” “immune system to be strengthened and the ageing process to be slowed down.” EX1004 [Weth], 5:19-25. The treatment also “yield[s] a reduction in embolisms and thromboses” (*id.*, 5:27-30), “improves quality of sleep” (*id.*, 12:34-35), and “[leads] to a significant improvement in” depression. *Id.*, 13:24-33. In addition, Weth’s lamp enables prevention of “the formation of pathological amino acids” (*id.*, 16:1-7), “diseases caused by coagulation disorders” (*id.*, 5:37-6:3), and “myocardial infarctions and strokes.” *Id.*, 5:19-23. EX1005, ¶75.

2. **Dependent Claim 6**

a. **Claim 6: “The method of claim 1, said method further comprising enabling the prevention of at least one light responsive disorder in said at least one mammal.”**

Weth discloses claim 6. EX1005, ¶77.

Weth discloses “[t]he method of claim 1.” See Section X.A.1 [claim 1]. EX1005, ¶76.

In addition, Weth discloses “*said method further comprising enabling the prevention of at least one light responsive disorder in said at least one mammal.*”

For example, use of Weth’s lamp as “a tabletop or ceiling lamp” enables “possibly completely **prevent[ing]**” or at least as a “**prophyla[ctic]**” measure (EX1004 [Weth], 9:5-8) for “**avoidance** of myocardial infarctions and strokes” (*id.*, 5:19-25) and “**prevent[ion of]** diseases caused by coagulation disorders.” *Id.*, 5:37-6:3. For example, “none of the [1000] subjects and patients [who were treated with light from the energy-saving lamp] had a myocardial infarction or stroke.” *Id.*, 10:18-26. *See also* Section X.A.1.a [element [1-pre]], Section X.A.1.c [element [1b]]. EX1005, ¶77.

**B. Ground II: Claims 2-5 and 7-9 Would Have Been Obvious Over Weth in Combination with Weber**

**1. Combination of Weth and Weber (“Weth-Weber”)**

Weth recognizes the need for a light composition that reduces “unpleasant side effects” (EX1004 [Weth], 1:8-14) and is “substantially more pleasant to the eye than the spectrum of conventional illuminants” (*id.*, 5:10-11) while providing therapeutic capabilities for prevention and/or treatment of light-related disorders. *See* Section IX.A [Overview of Prior Art—Weth]. EX1005, ¶78.

Regarding undesirable side-effects, Weth identifies “headaches and nausea” as potential side effects that are avoided (EX1004 [Weth], 1:9-14) by maintaining the luminosity of its lamp below 6000 lux. *Id.* Weth recognizes, however, that the

reduced luminosity may limit use of its lamp to the environments which are already at least partially illuminated, for example, “at the place of work.” *Id.*, 1: 23-25, 9:29-32. Thus, while Weth’s lamp may be satisfactory in certain limited environments, a POSITA would have recognized that Weth’s lamp luminosity was not sufficient in all work environments (or environments in general) to provide enough lighting for a particular task. Furthermore, a POSITA would have known that increased light intensity can improve the effectiveness of certain therapies. *See, e.g.*, EX1010, 1267 (increased light intensity improves control of circadian rhythm through suppression of melatonin). EX1005, ¶79.

To address such needs, a POSITA would have been motivated to consider relevant techniques in the prior art for providing Weth’s light composition at higher luminosity while still avoiding side effects such as “headaches and nausea.” For example, a POSITA would have known that headache and nausea may be attributed to the yellow component (approximately 580 nm to 600 nm) in sunlight. EX1013, 200. *See* Section V.E [Technology Background—Side Effects of Broad Spectrum Light Therapy]. Moreover, a POSITA would have expected yellow light to be present in Weth’s light composition because it “is very close to sunlight” (EX1004 [Weth], 2:21-22) and because 580 nm is among the spectral lines optionally emitted by the lamp. *Id.*, 3:13-20. To address this issue, a POSITA would have considered the use of a suitable light filter to remove the yellow portion of the light spectrum

emitted from Weth's lamp. For example, a POSITA would have been aware of Weber, a patent disclosing filters that can substantially filter the yellow spectrum. *See* Section IX.C [Analogous Art]. Weber's Figure 19 discloses the performance of a filter that removes nearly all of the **yellow spectrum** while transmitting a substantial portion of the spectrum below 500 nm:

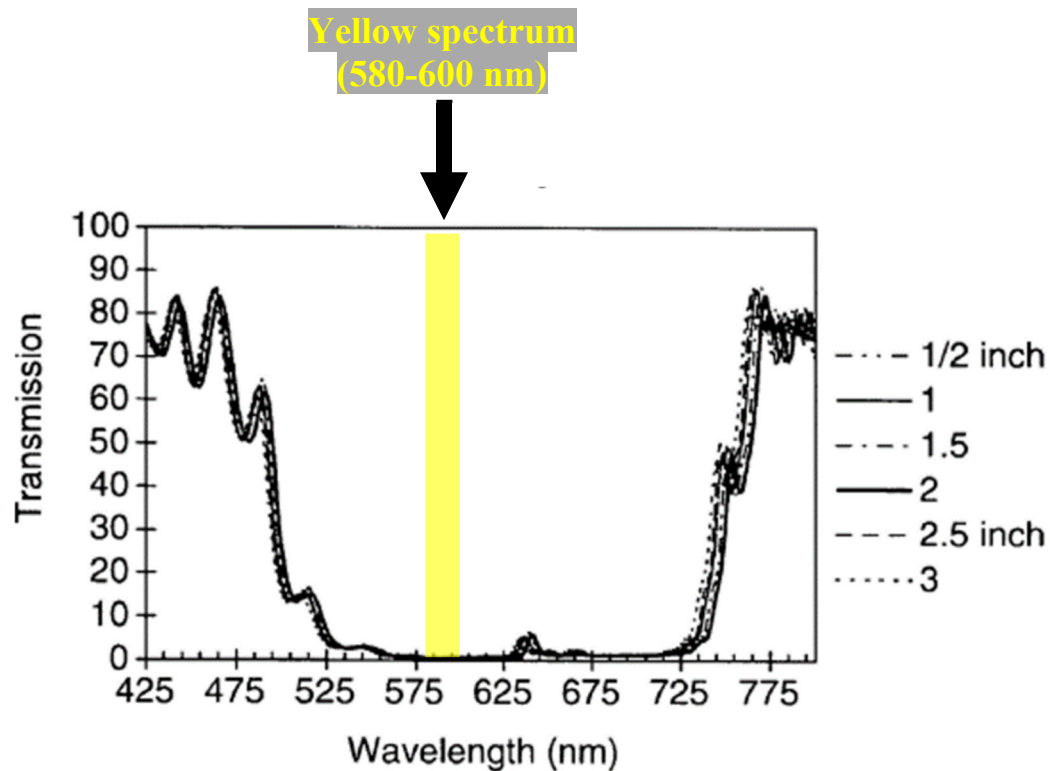


FIG. 19

EX1022 [Weber], FIG. 19 (annotated). *See* Section IX.B [Overview of Prior Art—Weber]. EX1005, ¶80.

It would have been obvious to combine Weth's lamp with Weber's filter by arranging the two components such that Weth's light composition passed through

the filter before reaching a subject. In particular, doing so would have amounted to applying a known technique (light filtering using Weber's filter) to a known device ready for improvement (Weth's lamp) to yield the predictable result of a lamp that can be operated at higher luminosities without introducing the undesirable side effects of headaches and nausea identified by Weth. EX1004 [Weth], 1:9-14. EX1005, ¶81.

In addition to eliminating undesirable side effects, adding Weber's filter would have also made the light more desirable for viewing by a subject, which would increase the subject's ocular exposure to the light during a therapy session. For example, Weber teaches that its filter provides a "colored display[]" in an "eye-catching manner" that "draw[s] attention." EX1022 [Weber], 1:10-14. EX1005, ¶82.

A POSITA would have had a reasonable expectation of success, and would have succeeded, in combining Weth's lamp with Weber's filter to produce a therapeutically effective light composition that could be operated at a higher luminosity without introducing undesirable side effects. A POSITA would have known that the luminosity of Weth's lamp could be increased to a desired level suitable to a particular environment or to a particular therapeutic use by increasing the illuminance of the lamp. In addition, Weber's film is designed to be used in

conjunction with a lamp. EX1022 [Weber], 86:35-49 (simple filter is “used as a filter in a backlit light fixture” such as a lamp). EX1005, ¶83.

## 2. Dependent Claim 2

- a. **Claim 2:** *“The method of claim 1, said method further comprising providing at least one light filtering component in conjunction with said at least one light source; and causing said at least one light filtering component to transmit therapeutically effective optical radiation.”*

The Weth-Weber combination discloses claim 2. EX1005, ¶85.

Weth discloses “[t]he method of claim 1.” See Section X.A.1 [claim 1]. EX1005, ¶84.

Weber discloses “*said method further comprising providing at least one light filtering component in conjunction with said at least one light source.*” For example, Weber’s filter transmits UV and visible components of optical radiation with wavelengths below 500 nm (EX1022 [Weber], 6:31-33, FIG. 19), which includes “*therapeutically effective optical radiation*” from Weth’s light source “[comprising] **spectral lines:** 251 nm ( $\pm 5$  nm), 265 nm ( $\pm 15$  nm), 290 nm ( $\pm 15$  nm), 319 nm ( $\pm 10$  nm), 335 nm ( $\pm 15$  nm), 368 nm ( $\pm 15$  nm)” (EX1004 [Weth], 1:34-36) and “380 nm ( $\pm 15$  nm), 410 nm ( $\pm 15$  nm), **438 nm** ( $\pm 15$  nm), 490 nm ( $\pm 15$  nm), 515 nm ( $\pm 15$  nm), 540 nm ( $\pm 15$  nm), 580 nm ( $\pm 15$  nm), 610 nm ( $\pm 15$  nm), 650 nm ( $\pm 15$  nm), 690 nm ( $\pm 15$  nm), 710 nm ( $\pm 15$  nm), 740 nm ( $\pm 15$  nm), 770 nm ( $\pm 15$  nm), 800 nm ( $\pm 15$  nm).

nm).” *Id.*, 3:16-20. The transmitted optical radiation would comprise Weth’s spectral peak at 438 nm. *Id.* See also *id.*, 19:3-15 [claims 1 and 2]. EX1005, ¶84.

### 3. Dependent Claim 3

- a. **Claim 3:** “*The method of claim 2 wherein said method further comprises providing at least one transparent composition in conjunction with said at least one light filtering component.*”

The Weth-Weber combination discloses claim 3. EX1005, ¶87.

The Weth-Weber combination discloses “[t]he method of claim 2.” See Section X.B.2 [claim 2]. EX1005, ¶86.

In addition, Weber discloses “*wherein said method further comprises providing at least one transparent composition in conjunction with said at least one light filtering component.*” For example, Weber discloses an embodiment in which its color filter (EX1022 [Weber], 19:21-31) is placed on a substrate that is “transparent (transparent to certain colors, i.e., clear without diffusers, but colored).” *Id.*, 73:31-32. This embodiment transmits optical radiation in the range of at least 425 nm to 500 nm, which encompasses Weth’s spectral peak at 438 nm. *Id.*, FIGS. 19, 32. EX1005, ¶86.

### 4. Dependent Claim 4

- a. **Claim 4:** “*The method of claim 2 wherein said method further comprises providing at least one translucent composition in conjunction with said at least one light filtering component.*”

The Weth-Weber combination discloses claim 4. EX1005, ¶89.

The Weth-Weber combination discloses “[t]he method of claim 2.” See Section X.B.2 [claim 2]. EX1005, ¶88.

In addition, Weber discloses “*wherein said method further comprises providing at least one translucent composition in conjunction with said at least one light filtering component.*” For example, Weber discloses an embodiment in which its color filter film (EX1022 [Weber], 19:21-31) is placed on a substrate that is “translucent (diffusely transmitting, with various amounts of haze).” *Id.*, 73:30-31. Furthermore, this embodiment transmits optical radiation in the range of at least 425 nm to 500 nm, which encompasses Weth’s spectral peak at 438 nm. *Id.*, FIGS. 19, 32. EX1005, ¶88.

## **5. Dependent Claim 5**

### **a. Claim 5: “*The method of 2 wherein said light filtering component further comprises at least one translucent composition.*”**

The Weth-Weber combination discloses claim 5. EX1005, ¶90.

The Weth-Weber combination discloses “[t]he method of claim 2.” See Section X.B.2 [claim 2]. EX1005, ¶90.

Furthermore Weber discloses “*said light filtering component further comprises at least one translucent composition*” for the same reasons given in Section X.B.4 [claim 4]. EX1005, ¶90.

**6. Dependent Claim 7**

- a. Claim 7:** *“The method of claim 6, said method further comprising providing at least one light filtering component in conjunction with said at least one light source; and causing said at least one light filtering component to transmit therapeutically effective optical radiation.”*

As discussed above in Section X.A.2 [claim 6], Weth discloses “[t]he method of claim 6.” In addition, the Weth-Weber combination renders obvious “said method further comprising providing at least one light filtering component in conjunction with said at least one light source; and causing said at least one light filtering component to transmit therapeutically effective optical radiation” for the reasons discussed above in Section X.B.2 [claim 2]. EX1005, ¶91.

**7. Dependent Claim 8**

- a. Claim 8:** *“The method of claim 7 wherein said method further comprises providing at least one transparent composition in conjunction with said at least one light filtering component.”*

As discussed above in Section X.B.6 [claim 7], the Weth-Weber combination renders obvious “[t]he method of claim 7.” In addition, the Weth-Weber combination renders obvious “wherein said method further comprises providing at least one transparent composition in conjunction with said at least one light filtering component” for the reasons discussed above in Section X.B.3 [claim 3]. EX1005, ¶92.

**8. Dependent Claim 9**

- a. **Claim 9:** “*The method of claim 7 wherein said method further comprises providing at least one translucent composition in conjunction with said at least one light filtering component.*”

As discussed above in Section X.B.6 [claim 7], the Weth-Weber combination renders obvious “[t]he method of claim 7.” In addition, the Weth-Weber combination renders obvious “*wherein said method further comprises providing at least one translucent composition in conjunction with said at least one light filtering component*” for the reasons discussed above in Section X.B.4 [claim 4]. EX1005, ¶93.

**XI. DISCRETIONARY DENIAL IS NOT WARRANTED**

**A. 35 U.S.C. §325(d) Does Not Favor Denial**

Petitioner respectfully submits that the Board institute this Petition because it presents new prior art and arguments not previously evaluated by the Office. *Adv. Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6, 8-9 (P.T.A.B. Feb. 13, 2020) (precedential). The Board applies its institution discretion under § 325(d) regarding “prior art or arguments ... presented to the Office” using a two-part framework: (1) whether the “same or substantially the same prior art or arguments previously were presented to the Office”; and (2) if so, whether “the Office erred in a manner material to the patentability of challenged claims.” *Id.*, 8.

This Petition presents strong prior art references—Weth and Weber—that were not before the Office. Weth is not cumulative of any previously-considered prior art because it specifically teaches treatment and prevention using ocular light therapy including a spectral peak in the claimed range of 435-488 nm. Weber is not cumulative of any previously-considered prior art because it specifically teaches the use of a light filter to achieve the claimed light composition. *See* Section IX [Overview of Prior Art].

Furthermore, the Examiner also did not have the benefit of Dr. Heller's declaration (EX1005), which details what a POSITA would have understood from Weth and Weber as of the filing date of the '140 patent.

Thus, for the reasons stated above, this Petition demonstrates that there is a reasonable likelihood that the Petitioner would prevail with respect to at least one challenged claim. Discretionary denial under § 325(d) would not be appropriate.

**B. *Fintiv* Factors Favor Institution**

Although there is concurrent district court litigation involving the '140 patent, the weight of the factors described in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11, 5-6 (Mar. 20, 2020) (precedential) favors institution of this Petition.

**1. The potential for a stay of the district court case urges against denial (factor 1)**

Petitioner plans to seek a stay of the pending district court proceedings prior to the Board's decision on institution.

**2. The district court trial date favors institution (factor 2)**

Factor 2 favors institution if a final written decision will be rendered prior to the parallel litigation's scheduled trial date. Trial in the parallel litigation is scheduled for July 2024, several months after a final written decision is likely to be issued in this IPR. Although the Board is disinclined to speculate on district court schedules, the schedule in this district court case is already trailing several months behind a projected final written decision date in this IPR. While the district court's trial schedule is only likely to slip later in time, the Board's schedule will be set firm. Accordingly, factor 2 significantly favors institution.

**3. Minimal investment in the parallel district court proceeding (factor 3)**

Factor 3 weighs in favor of institution if investment in the parallel proceeding is limited. *See Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12, 16-17 (P.T.A.B. Dec. 1, 2020) (precedential). Here, the concurrent district court litigation involving the '140 patent, filed in July 2021, is still at a nascent stage and neither the court nor the parties have invested substantively in the litigation. Preliminary invalidity contentions are not due until December 12, 2022, claim construction briefing does not begin until May 2023, and the trial is not scheduled to commence until July 2024. The parties and the district court have not invested substantially, much less specifically "in the merits of the invalidity positions" pertaining to the '140 patent. *Verizon Bus. Network Servs. Inc. v. Huawei Techs.*

*Co. Ltd.*, IPR2020-01080, Paper 11, 13-14 (P.T.A.B. Jan. 14, 2021) (“[T]he investment in the parallel proceeding related to the validity issue is minimal” when parties had not submitted dispositive briefing on validity issues). Moreover, Petitioner acted diligently by filing the IPR petition less than five months from the filing of the concurrent district court litigation. Thus, factor 3 strongly favors institution. *See Sotera Wireless*, IPR2020-01019, Paper 12, 16-17; *Weatherford U.S., L.P. v. Enventure Global Technology, Inc.*, IPR2020-01580, Paper 14, 13-14 (P.T.A.B. Mar. 26, 2021).

#### **4. Remaining factors are neutral or favor institution**

Petitioner reserves the right to enter a stipulation relating to the district court case that would prevent and/or reduce overlap with the requested IPR, should the Board deem one necessary (factor 4). Such a stipulation would mitigate concerns about duplicative efforts in the district court case and this IPR proceeding. *See Sand Revolution II, LLC v. Cont’l Intermodal Grp. – Trucking LLC*, IPR2019-01393, Paper 24, 12 (P.T.A.B. June 16, 2020) (informative).

The Petitioner (Bombardier Inc.) is a real party-in-interest of the defendant (Bombardier Aerospace Corporation) in the district court litigation (factor 5).

The merits of this Petition strongly support institution (factor 6). “[I]f the merits of a ground raised in the petition seem particularly strong on the preliminary record...the institution of a trial may serve the interest of overall system efficiency

and integrity....” *Fintiv*, IPR2020-00019, Paper 11, 14-15. Moreover, the USPTO’s recent guidance states that “the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability.” EX1025 [Fintiv Guidance Memo], 2. As described above, Weth clearly and compellingly anticipates claims 1 and 6 of the ’140 patent and the combination of Weth and Weber clearly and compellingly disclose and renders obvious claims 2-5 and 7-9 of the ’140 patent. The strength of the prior art and its close correspondence to the challenged claims favors institution.

## **XII. CONCLUSION**

Based on the foregoing, claims 1-9 of the ’140 patent recite subject matter that is unpatentable. Petitioner requests institution of an *inter partes* review to cancel claims 1-9. EX1005, ¶94.

Respectfully Submitted,

Dated: December 1, 2022

/Monica Grewal/  
Monica Grewal  
Registration No. 40,056

**Table of Exhibits for U.S. Patent 7,678,140 Petition for *Inter Partes* Review**

| Exhibit | Description                                                                                                                                                                                                                                                               |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1001    | U.S. Patent No. 7,678,140                                                                                                                                                                                                                                                 |
| 1002    | File History of U.S. Patent No. 7,678,140                                                                                                                                                                                                                                 |
| 1003    | Encyclopædia Britannica, The visible spectrum (online). Available at <a href="https://www.britannica.com/science/color/The-visible-spectrum">https://www.britannica.com/science/color/The-visible-spectrum</a> . Visited November 21, 2022.                               |
| 1004    | German Patent No. 29618670U1 (“Weth”) (certified translation attached “Energy-saving lamp for medical therapies”)                                                                                                                                                         |
| 1005    | Declaration of Dr. Horace Craig Heller                                                                                                                                                                                                                                    |
| 1006    | Grossweiner et al., <i>The Science of Phototherapy: An Introduction</i> . Springer, First Edition (2005)                                                                                                                                                                  |
| 1007    | Choukroun and Geoffroy, <i>Light Therapy in Mood Disorders: A Brief History with Physiological Insights</i> , <i>Chronobiol Med.</i> , 1(1):3-8 (2019)                                                                                                                    |
| 1008    | Czeisler et al., <i>Entrainment of Human Circadian Rhythms by Light-Dark Cycles: A Reassessment</i> , <i>Photochemistry and Photobiology</i> , 34, 239 (1981) (“Lewy”)                                                                                                    |
| 1009    | Britannica, “The electromagnetic spectrum.” Available at <a href="https://www.britannica.com/science/electromagnetic-spectrum#/media/1/183297/106806">https://www.britannica.com/science/electromagnetic-spectrum#/media/1/183297/106806</a> . Visited November 21, 2022. |
| 1010    | Lewy et al., <i>Light suppresses melatonin secretion in humans</i> , <i>Science</i> , 12;210 (4475):1267-69 (1980)                                                                                                                                                        |
| 1011    | Czeisler et al., <i>Bright Light Resets the Human Circadian Pacemaker Independent of the Timing of the Sleep-Wake Cycle</i> , <i>Science</i> , 233(4764):667-671 (1986)                                                                                                   |

| Exhibit | Description                                                                                                                                                                         |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1012    | Canada Patent No. 2209694                                                                                                                                                           |
| 1013    | Wirz-Justice et al., <i>Light treatment of seasonal affective disorder in Switzerland</i> , Acta Psychiatrica Scandinavica, 74:193-204 (1986) (“Wirz-Justice”)                      |
| 1014    | Ennever, <i>Blue Light, Green Light, White Light, More Light: Treatment of Neonatal Jaundice</i> , Clinics in Perinatology, 17(2): 467-481 (1990).                                  |
| 1015    | Lee et al., <i>Spectral properties of phototherapy for seasonal affective disorder: a meta-analysis</i> , Acta Psychiatrica Scandinavica, 96: 117-121 (1997)                        |
| 1016    | Shanahan et al., <i>Resetting the Melatonin Rhythm with light in Humans</i> , Journal of Biological Rhythms, 12(6): 556-567 (1997)                                                  |
| 1017    | Britannica, “retina.” Available at <a href="https://www.britannica.com/science/retina">https://www.britannica.com/science/retina</a> . Visited November 21, 2022.                   |
| 1018    | U.S. Patent No. 5,047,006                                                                                                                                                           |
| 1019    | U.S. Patent No. 5,849,027                                                                                                                                                           |
| 1020    | Provisional Application No. 60/228,493                                                                                                                                              |
| 1021    | Provisional Application No. 60/203,308                                                                                                                                              |
| 1022    | U.S. Patent No. 6,531,230 (“Weber”)                                                                                                                                                 |
| 1023    | Morita et al., <i>Inhibitory Effect of Light of Different Wavelengths on the Fall of Core Temperature during the Nighttime</i> , Japanese Journal of Physiology, 45: 667-671 (1995) |
| 1024    | Declaration of Dr. Sylvia Hall-Ellis                                                                                                                                                |

| Exhibit | Description                                                                                                                                                                                                       |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1025    | Director Vidal, Memorandum: Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (June 21, 2022)                                                     |
| 1026    | Aschoff et al., <i>Circadian rhythms in men under as influenced by light-dark cycles of various periods</i> , Pflugers Arch. 306:58-70 (1969)                                                                     |
| 1027    | Campbell et al., <i>Light treatment for sleep disorders: consensus report. I. Chronology of seminal studies in humans</i> , Review J. Biol. Rhythms., 10(2):105-9 (1995)                                          |
| 1028    | Provencio et al., <i>A Novel Human Opsin in the Inner Retina</i> , The Journal of Neuroscience 20(2): 600-605 (2000)                                                                                              |
| 1029    | RESERVED                                                                                                                                                                                                          |
| 1030    | World Health Organization, “Lasers and Optical Radiation” (1982)                                                                                                                                                  |
| 1031    | International Commission on Non-Ionizing Radiation Protection, <i>Guidelines on Limits to Exposure to Broad-Band Incoherent Optical Radiation (0.38 to 3 μM)</i> , Health Physics: 73(3):539-554 (1997)           |
| 1032    | Levine, “Chapter 1: An Introduction to Neuroendocrine Systems,” Handbook of Neuroendocrinology, Fink et al. Eds. Academic Press, 3-19 (2012)                                                                      |
| 1033    | Cleveland Clinic, “Dopamine.” Available at <a href="https://my.clevelandclinic.org/health/articles/22581-dopamine">https://my.clevelandclinic.org/health/articles/22581-dopamine</a> . Visited November 28, 2022. |
| 1034    | Watson et al., <i>Neuropharmacology of Sleep and Wakefulness</i> , Sleep Med. Clin., 5:513-528 (2010)                                                                                                             |

**CERTIFICATE UNDER 37 CFR § 42.24(d)**

Under the provisions of 37 CFR § 42.24(d), the undersigned hereby certifies that the word count for the foregoing Petition for *Inter Partes* Review totals 8,096 words, which is less than the 14,000 words allowed under 37 CFR § 42.24(a)(1)(i).

Respectfully submitted,

Dated: December 1, 2022

/Jonathan P Knight/  
Jonathan P. Knight  
Reg. No. 69,866

**CERTIFICATE OF SERVICE**

I hereby certify that on December 1, 2022, I caused a true and correct copy of the foregoing materials:

- Petition for *Inter Partes* Review of U.S. Patent No. 7,678,140 Under 35 U.S.C. § 312 and 37 C.F.R. § 42.104
- Exhibit List
- Exhibits for Petition for *Inter Partes* Review of U.S. Patent No. 7,678,140 (1001-1028, 1030-1034)
- Power of Attorney
- Fee Authorization
- Word Count Certification Under 37 CFR § 42.24(d)

to be served via Federal Express on the following correspondent of record as listed on PAIR:

ARENTFOX SCHIFF LLP - Los Angeles  
555 West Fifth Street  
48th Floor  
Los Angeles, CA 90013

/Jonathan P Knight/  
Jonathan P. Knight  
Reg. No. 69,866