

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

GLUX VISUAL EFFECTS TECH (shenzhen) CO.,
LEYARD OPTOELECTRONIC CO.,
SHENZHEN LIANTRONICS CO., LTD., and
UNILUMIN GROUP CO., LTD.,
Petitioner,

v.

ULTRAVISION TECHNOLOGIES, LLC,
Patent Owner.

IPR2020-01050
Patent 9,978,294 B1

Before DENISE M. POTHIER, SCOTT A. DANIELS, and
ROBERT L. KINDER, *Administrative Patent Judges*.

DANIELS, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 3[1]8(a)
Dismissing In Part and Denying In Part
Patent Owner's Motion to Exclude Evidence
37 C.F.R. § 42.64

I. INTRODUCTION

A. Background

Glux Visual Effects Tech (Shenzhen) Co., Leyard Optoelectronic Co., Shenzhen Liantronics Co., Ltd., and Unilumin Group Co., Ltd. (“Petitioner”) requested *inter partes* review of claims 1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, and 30 of U.S. Patent No. 9,978,294 B1 (Ex. 1001, “the ’294 patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 4 (“Petition” or “Pet.”). Ultravision Technologies, LLC (“Patent Owner”) filed a Preliminary Response. Paper 9. Pursuant to 35 U.S.C. § 314, we granted the request and instituted *inter partes* review as to all challenged claims on all grounds presented in the Petition. Paper 10 (“Inst. Dec.”).

After institution, Patent Owner filed a Response (Paper 18, “PO Resp.”), Petitioner filed a Reply (Paper 22, “Reply”), and Patent Owner filed a Sur-reply (Paper 24, “Sur-reply”). Patent Owner also filed a Motion to Exclude Evidence. (Paper 28, “Mot.”). Petitioner filed an Opposition to Patent Owner’s Motion to Exclude Petitioner’s Evidence. (Paper 29, Opp. Mot.”). Patent Owner filed a Reply to Petitioner’s Opposition to Motion to Exclude. (Paper 31, “Reply Opp. Mot.”). A hearing was held on August 24, 2021, and a transcript of the hearing is included in the record. Paper 32 (“Tr.”).¹

We have jurisdiction under 35 U.S.C. § 6(b). This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the claims on which we instituted trial. Petitioner bears the burden of proving unpatentability of the Challenged Claims, and

¹ The hearing for this proceeding, as well as IPR2020-01049, and IPR2020-01052 were held together. Paper 25 (Order Granting the Parties for Oral Hearing), 2.

the burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2019). Having reviewed the arguments and the supporting evidence, we determine that Petitioner (1) has shown, by a preponderance of the evidence, that claims 1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, and 30 of the '294 patent are unpatentable.

B. Related Proceedings

The parties indicate various cases pending before the United States District for the Eastern District of Texas that are related matters. Pet. 1–2; Paper 7, 1–3. Petitioner further indicates some of these cases were consolidated into *Ultravision Technologies, LLC v. GoVision, LLC*, Case No. 2:18-cv-00100-JRG-RSP (E.D. Tex.) and concern the '294 patent. Pet. 2. Petitioner also indicates that it received an amended complaint on May 27, 2020. *Id.* at 2–3.

C. Real Parties in Interest

Petitioner identifies Shenzhen Absen Optoelectronic Co., Absen, Inc., Ledman Optoelectronic Co., Ltd., Glux Visual Effects Tech (Shenzhen) Co., Leyard Optoelectronic Co., Shenzhen Liantronics Co., Ltd., and Unilumin Group Co., Ltd. as “potential real parties-in-interest.” Pet. 1.

D. Instituted Grounds of Unpatentability

We instituted *inter partes* review of all challenged claims based on all grounds of unpatentability asserted in the Petition, which are as follows:

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1, 2, 9, 13, 20	102	Guoshi ²
7, 18, 22–24, 26–28	103	Guoshi, Kim, ³ Panagotacos ⁴
30	103	Guoshi, Kim, Nicholson ⁵

Inst. Dec. 2; Pet. 4–5. Petitioner supports its challenges with a declaration of Mr. Richard Flasck. Ex. 1005. Patent Owner supports its positions with a declaration of Mr. Thomas Credelle. Ex. 2002.

E. The '869 Patent

The '294 patent (Ex. 1001), titled “Modular Display Panel,” relates to “[l]arge displays (e.g., billboards), such as those commonly used for advertising in cities and along roads, [and] generally have one or more pictures and/or text that are to be displayed under various light and weather conditions.” Ex. 1001, 2:16–19. The '294 patent more specifically describes

[i]n one embodiment, modular display panel comprises a casing having a recess. The casing comprises locking points for use in attachment to an adjacent casing of another modular display panel. A printed circuit board is disposed in the recess and a plurality of LEDs attached to the printed circuit board. A driver circuit is attached to the printed circuit board. A heat sink is disposed between a back side of the casing and the printed circuit board. The heat sink thermally contacts the back side of the casing and the printed circuit board. A framework of louvers is

² Ex. 1008, CN 103280164 A (published Sept. 4, 2013).

³ Ex. 1010, KP 2002-0069818 (published Sept. 5, 2002).

⁴ Ex. 1011, WO 02/23956 A2 (published Mar. 21, 2002).

⁵ Ex. 1012, U.S. Patent No. 6,175,342 B1 (issued Jan. 16, 2001).

disposed over the printed circuit board. The framework of louvers is disposed between rows of the LEDs.

Id. at 2:40–51. Figures 1A and 1B, below, as annotated by the Board, illustrate the front and back of multi-panel display 100.

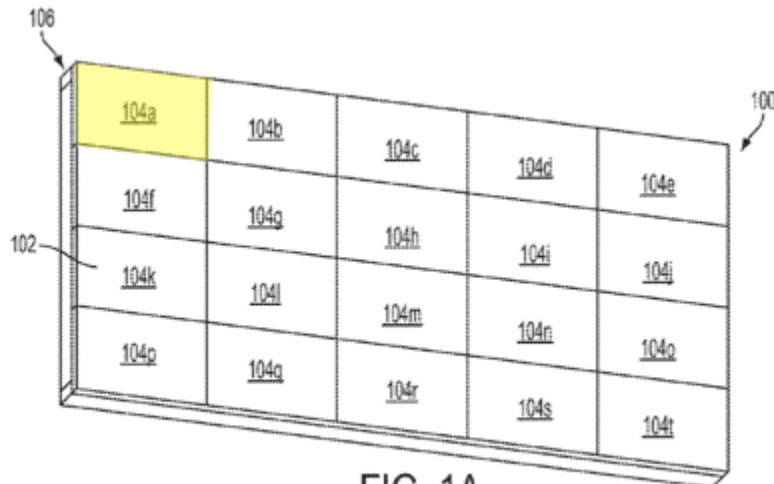


FIG. 1A

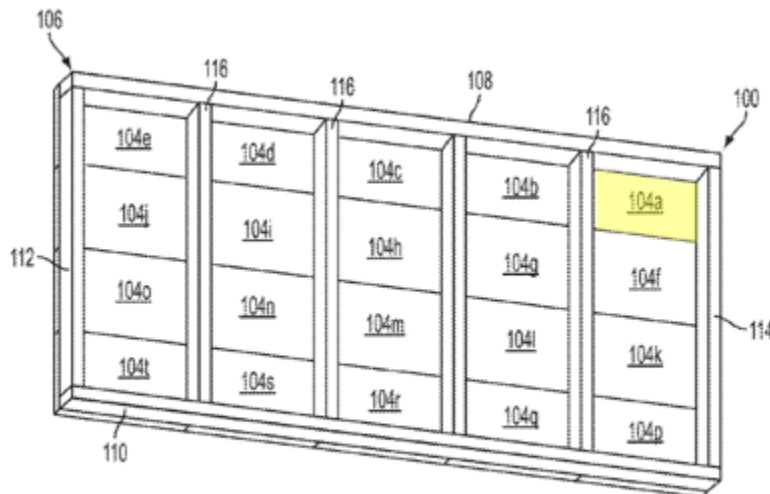


FIG. 1B

Annotated Figures 1A and 1B, above, depict an embodiment of multi-panel display 100 disclosed in the '294 patent, with modular display panel 104a, shown as highlighted by the Board. *Id.* at 3:20–21.

The '294 patent describes that

[t]he display 100 includes a display surface 102 that is formed by multiple lighting panels 104a-104t. In the present embodiment, the panels 104a-104t use light emitting diodes (LEDs) for illumination, but it is understood that other light sources may be used in other embodiments. The panels 104a-104t typically operate together to form a single image, although multiple images may be simultaneously presented by the display 100. In the present example, the panels 104a-104t are individually attached to a frame 106, which enables each panel to be installed or removed from the frame 106 without affecting the other panels.

Id. at 6:66–7:10.

Figures 2A–2C (below) illustrate “one embodiment of an LED panel 200 . . . that may be used as one of the LED panels 104a-104t of FIGS. 1A and 1B.” *Id.* at 7:37–39.

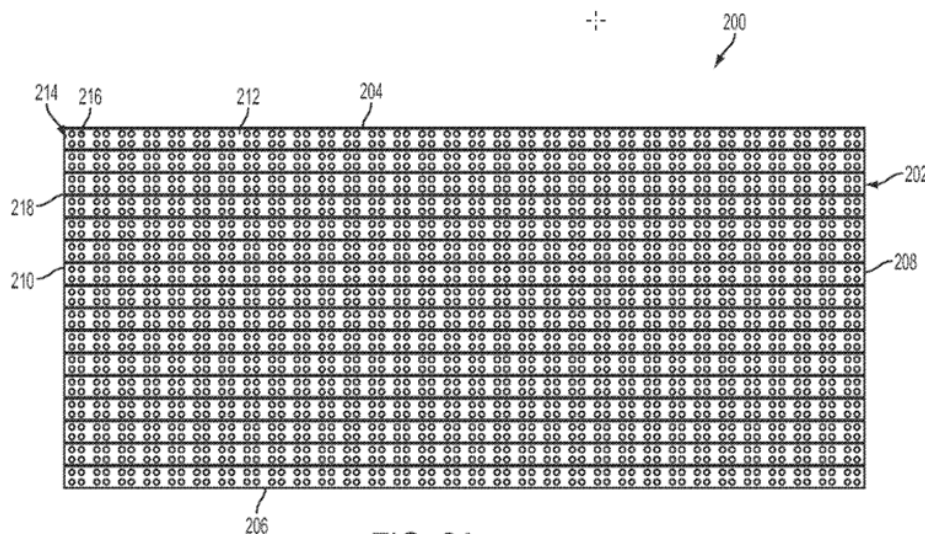


Figure 2A, above, “illustrates a front view of the LED panel 200 with LEDs aligned in a 16x32 configuration.” *Id.* at 7:59–61. The ’294 patent explains,

[r]eferring specifically to FIG. 2A, in the present example, the LED panel 200 includes a substrate 202 that forms a front surface of the panel 200. The substrate 202 in the present embodiment is rectangular in shape, with a top edge 204, a bottom edge 206, a right edge 208, and a left edge 210. A substrate surface 212

includes “pixels” 214 that are formed by one or more LEDs 216 on or within the substrate 202. In the present example, each pixel 214 includes four LEDs 216 arranged in a pattern (e.g., a square).

Id. at 7:65–8:6. As also shown in Figure 2A, above, the ’294 patent describes that “[l]ouvers 218 may be positioned above each row of pixels 214 to block or minimize light from directly striking the LEDs 216 from certain angles.” *Id.* at 8:31–33.

Figure 2B of the ’294 patent showing circuitry and power supply for LED panel 200, is reproduced below.

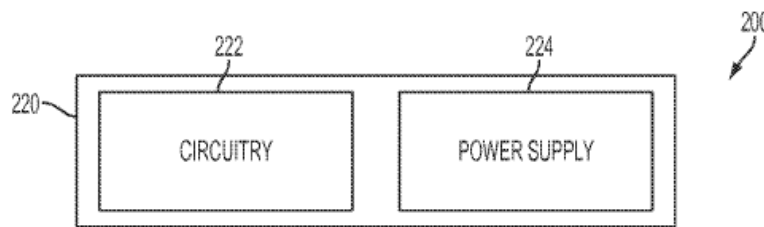


FIG. 2B

As shown in Figure 2B, above, the ’294 patent describes

one embodiment of the panel 200 illustrates a housing 220. The housing 220 contains circuitry 222 and a power supply 224. The circuitry 222 is coupled to the LEDs 216 and is used to control the LEDs. The power supply 224 provides power to the LEDs 216 and circuitry 222.

Id. at 8:41–46. The ’294 patent explains further that “[i]n the present example, the housing 220 is sealed to prevent water from entering the housing.” *Id.* at 8:53–54. The ’294 patent also describes that “the housing 220 may be sealed to have an ingress protection (IP) rating such as IP 67,

which defines a level of protection against both solid particles and liquid.”
Id. at 8:54–57.⁶

Figure 2C of the '294 patent showing another embodiment of LED modular panel 200, is reproduced below.

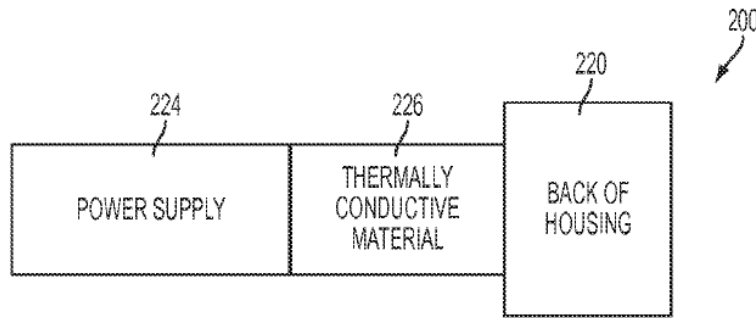


FIG. 2C

Figure 2C “illustrates one possible configuration of a power supply positioned within the panel 200 relative to a back plate of the panel 200.” *Id.* at 7:62–64. The '294 patent describes that in “FIG. 2C, one embodiment of the panel 200 illustrates how the power supply 224 may be thermally coupled to the housing 220 via a thermally conductive material 226 (e.g., aluminum). This configuration may be particularly relevant in embodiments where the panel 200 is sealed and cooling is passive.” *Id.* at 8:64–9:2. Figure 24A, reproduced below, illustrates “a display panel in accordance with an embodiment of the present invention.” *Id.* at 22:45–47.

⁶ IP ratings are a numeric evaluation of the level of dust and water protection for a device. The first digit relates to dust protection and the second digit relates to water. Higher values indicate a greater degree of protection. Ex. 1016, 1.

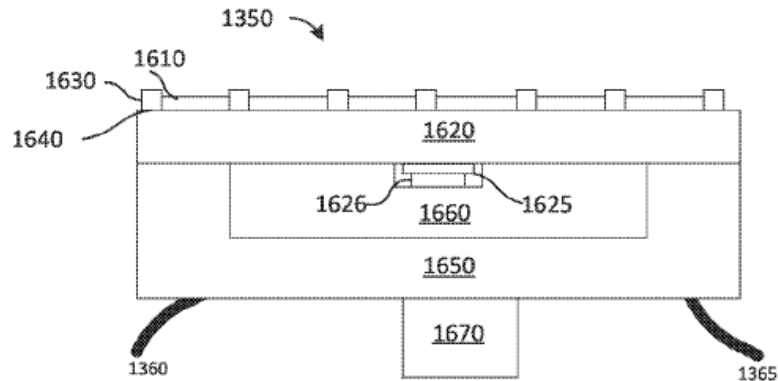


FIG. 24A

For Figure 24A, above, the '294 patent explains that “the modular LED display panel comprises a plurality of LEDs 1610 mounted on one or more printed circuit boards (PCBs) 1620, which are housed within a hermetically sealed enclosure or casing.” *Id.* at 23:6–9. The '294 patent describes that “[t]he PCB is mounted within a cavity of an enclosure, which may be a plastic casing 1650.” *Id.* at 23:19–20. Also shown in Figure 24A,

[a] power supply unit 1670 may be mounted over the casing 1650 for powering the LEDs 1610. The power supply unit 1670 may comprise a LED driver in various embodiments. The LED driver may include a power converter for converting ac to dc, which is supplied to the LEDs 1610. Alternatively, the LED driver may comprise a down converter that down converts the voltage suitable for driving the LEDs 1610. For example, the down converter may down convert a dc voltage at a first level to a dc voltage at a second level that is lower than the first level. This is done so that large dc currents are not carried on the power cables. The LED driver is configured to provide a constant dc current to the LEDs 1610.

Id. at 23:53–65. The '294 patent explains further that “[i]n various embodiments, the display panel 1350 is sealed to an IP 67 standard. As discussed herein, other ratings are possible.” *Id.* at 24:12–14.

F. Claimed Subject Matter

The '294 patent has 30 claims, of which claims 1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, and 30 are challenged. Claims 1, 13, and 22 are the independent claims. Claim 1 illustrates the claimed subject matter and is reproduced below with emphasis added to particular limitations of importance:

1. A modular display panel comprising:
 - a first side and a second side opposite to the first side, wherein the first side of the modular display panel comprises a display surface of the modular display panel;
 - attachment points for use in attachment as part of a multi-panel modular display;
 - a plastic casing* comprising an outer surface of the modular display panel, the outer surface being part of the second side of the modular display panel;
 - a recess disposed in the plastic casing;
 - a printed circuit board disposed in the recess;
 - a plurality of LEDs arranged as pixels attached to a front side of the printed circuit board, wherein the pixels are arranged in a rectangular array comprising at least fifty pixels;
 - a framework of louvers disposed over the front side of the printed circuit board between rows of the plurality of LEDs;
 - a circuit for controlling the plurality of LEDs, the circuit being attached to the printed circuit board;*
 - a power supply for powering the plurality of LEDs;
- wherein the front side of the printed circuit board is sealed to be waterproof and the plastic casing is sealed to be waterproof so that the modular display panel is sealed to be waterproof; and

wherein the modular display panel is configured to be exposed to an external environment without a protective waterproof enclosure.

Ex. 1002, 32:6–35 (emphases added).

Independent claim 13 differs from claim 1 where claim 13 does *not* recite that the circuit for controlling the plurality of LEDs, “is attached to the printed circuit board,” as called for in claim 1. *Id.* at 33:47. Compared to claim 1, independent claim 22 further requires “the power supply mounted over the outer surface of the modular display panel,” and that the power supply is “an alternating current/direct current (AC/DC) converter.” *Id.* at 34:61–65. Independent claim 22 also recites “wherein the modular display panel is configured to be cooled passively without fans.” *Id.* at 35:8–9.

G. Level of Ordinary Skill in the Art

Based on Mr. Flasck’s testimony, Petitioner asserts:

A POSITA in the field of the ’294 patent at the time of the earliest possible priority date would have had at least an undergraduate degree in mechanical engineering, electrical engineering, or physics and, in addition, at least two years of experience in the design and/or implementation of LED panels.

Pet. 11 (citing Ex. 1005 ¶¶ 39–42).

Patent Owner does not set forth an ordinary artisan’s skill level.

See generally PO Resp. Rather, Mr. Credelle, Patent Owner’s expert, states that he “do[es] not disagree with Mr. Flasck’s proposed level of ordinary skill in the art.” Ex. 2002 ¶ 29.

In our Institution Decision, we preliminarily adopted Petitioner’s explanation and assessment of the ordinary skill level, determining the position was consistent with the ’294 patent and the asserted prior art. Inst. Dec. 12–13. As neither party challenges our preliminary finding regarding

the level of ordinary skill in the art, we see no reason to disturb this finding. Accordingly, we reaffirm that one of ordinary skill in the art at the time of the invention would have: (i) a bachelor's degree in mechanical engineering, electrical engineering, or physics, or undergraduate training in an equivalent field, and (ii) at least two years of experience in the design and/or implementation of LED panels. Additional graduate education could substitute for professional experience, and significant work experience could substitute for formal education. *See id.* at 12 (setting forth and adopting Petitioner's unopposed position as to the level of ordinary skill in the art) (citing Ex. 1005 ¶¶ 43–49).

II. CLAIM CONSTRUCTION

In this *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2019). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005).

The parties are seemingly at odds over two terms, “modular display panel” and “waterproof.” *Compare* PO Resp. 18–29, *with* Reply 2–10. Petitioner proposes broadly that we “interpret each claim term according to its plain meaning.” Pet. 12. Patent Owner argues that “modular display panel” should be in accordance with the District Court's construction so as to *not* include a cabinet. PO Resp. 18 (citing Ex. 1019, 18). Patent Owner proposes that the term “waterproof” be construed to mean “preventing water from entering the interior of the panel when exposed to weather.” *Id.* at 27 (citing Ex. 2002 ¶ 64).

A. “Modular Display Panel”

Patent Owner argues specifically that “modular display panel” should be construed so as to *not* include a cabinet. PO Resp. 18. Patent Owner points out that “[t]he District Court construed the term ‘modular display panel’ to mean ‘interchangeable display panel for a multi-panel modular display configured for use without a cabinet.’” *Id.* (citing Ex. 1019, 18). And, that “[t]he District Court further construed ‘cabinet’ to mean ‘enclosure separate from the LED panel(s) to protect the LED panel(s) from the environment, including water.’” *Id.* at 18 (citing Ex. 1021). Patent Owner further contends that Petitioner has agreed to this construction in the District Court proceeding. *Id.* at 18 n.1 (citing Exs. 2007, 2008).

Petitioner does not dispute this construction. During oral hearing Petitioner’s Counsel stated “I think that the parties agree that the display module of the challenged claims do not employ a cabinet.” Tr. 13:33–23. Based on the parties’ apparent agreement, and considering the record before us and the District Court’s Claim Construction Memorandum (Ex. 1019), we see no reason not to apply the District Court’s claim construction. *See* 37 CFR § 42.100(b) (Providing that any claim construction determination in a related civil action must be considered by the Board.). Accordingly, “modular display panel” means “interchangeable display panel for a multi-panel modular display configured for use without a cabinet.” Ex. 1019, 18.

B. “Waterproof”

In our Institution Decision we determined, and reaffirm here, that Petitioner complies with the applicable provisions of our rules, specifically 37 C.F.R. § 42.104(b)(3)–(4), by sufficiently identifying the claim construction it proposes as the basis for requesting review of the challenged claims. Inst. Dec. 14–15 (citing *Western Digital Corp. v. Spex Techs, Inc.*,

IPR2018-00084, Paper 14 at 10–12 (PTAB April 25, 2018) (distinguishing *Toyota Motor Corp. v. Blitzsafe Texas LLC*, IPR2016-00422, Paper 12 (PTAB July 6, 2016)). We also determined that both Petitioner’s and Patent Owner’s asserted claim constructions from the district court proceedings are generally consistent with the Specification of the ’294 patent—that is, the meaning of “waterproof” includes “preventing water from entering (the panel),” and “preventing water from entering the interior of the panel when exposed to weather.” Inst. Dec. 16 (citing Ex. 1006, 7, 36). In our Institution Decision, we did not find the conjunctive phrase “when exposed to weather,” in Patent Owner’s construction, afforded a significantly different meaning, and we explained that the parties are free to address the construction during trial. *Id.* at 17. Having reviewed the parties’ arguments and the additional evidence now before us, as well as the Specification of the ’294 patent, we resolve the conflict in favor of Petitioner’s construction.

Patent Owner argues there is a difference between the parties’ interpretations, and Patent Owner’s construction is more reasonable because its “construction would allow water to enter the interior of the panel under conditions beyond weather, while [Petitioner’s] would not allow water to enter the panel under any conditions.” PO Resp. 22–23 (citing Ex. 2002 ¶ 60). Patent Owner’s declarant, Mr. Credelle, testifies that Petitioner’s “proposed construction for ‘waterproof’ requires absolute protection against water, regardless of whether it is exposed to the weather.” Ex. 2002 ¶ 60. Mr. Credelle explains that different from Petitioner’s construction, “Patent Owner’s proposed construction [does] not require waterproofing under conditions such as submersion in water.” *Id.* ¶ 59.

Petitioner’s declarant, Mr. Flasck, testified in his deposition that the plain meaning of “waterproof” means “unaffected by water,” and further

explains that “a POSITA would understand the term to mean unaffected by normal weather conditions. That is, snow, rain, [and] fog.” Ex. 2010, 31:24–25, 33:10–13.⁷ Mr. Flask opined that “I don’t believe that a POSITA would think that [] a device has to be submersible or immersible completely in water to be waterproof.” *Id.* at 34:23–35:2. When questioned about IP ratings, Mr. Flask testified that a “[sixty] four would be considered somewhat waterproof or water resistant . . . a 65, 66 and above would – would qualify in a POSITA’s mind as being waterproof.” *Id.* at 36:23–37:5.

From *Phillips* we know that the specification “is always highly relevant to the claim construction analysis” and “is the single best guide to the meaning of a disputed term.” *Phillips*, 415 F.3d at 1315 (citation omitted). The ’294 patent Specification reveals that the electronic display panels are intended to be used in interior and also exterior weather dependent environments, and without a cabinet. *See* Ex. 1001, 5:36–43, 58–60 (The detailed description explaining that “[t]hese displays are designed to protect against weather, without a heavy cabinet,” and that, “weather is the number one culprit for damage to LED displays.”). The ’294 patent further describes LED panels where “the display is IP 67 rated and therefore waterproof and corrosion resistant, . . . in other embodiments, equipment can be designed with an IP 68 rating to operate completely underwater.” *Id.* at 5:48–55. The ’294 patent describes further that, “where weatherproofing is not as significant, the panels can have an IP 65 or IP 66 rating.” *Id.* at 5:56–57.

⁷ Exhibit 2010 replaces Exhibit 2004 which was a “rough draft transcript” that was uncertified. Ex. 2004, 1:9. During the hearing, the panel requested a certified transcript of the deposition record. *See* Tr. 5:22–6:16. We refer to the certified transcript, Ex. 2010, in this opinion. *See* Ex. 2010, 161.

Simply put, the Specification explains that there is a range of waterproofing where the higher the IP rating the more waterproof the device becomes. *Id.* at 5:48–57. Thus, the term “waterproof,” on its face, can cover a range of environmental conditions and IP ratings including “normal weather,” such as snow, rain, and fog as Mr. Flask confirmed during his deposition. Ex. 2010, 31:24–25, 33:10–13. In his Declaration, Mr. Flask also testifies that there are a range of waterproof enclosures, “IP 65 indicates a dust tight enclosure that is waterproof against jets of water[,] and IP 68 indicates a dust tight enclosure that is waterproof against continuous immersion in water.” Ex. 1005 ¶ 58 (citing Ex. 1016, 3). Considered as a whole, Mr. Flask’s testimony is consistent with the ’294 patent Specification—namely that a “waterproof” display can include protection from normal weather conditions as well as when “operat[ing] completely underwater.” Ex. 1001, 5:55.

We understand from both declarant’s testimony that “waterproof” should encompass normal weather events, however, Patent Owner’s claim construction and the limiting phrase “when exposed to weather,” improperly reads out of the term “waterproof,” the higher IP ratings and environmental conditions such as submersion in water. Patent Owner’s Declarant, Mr. Credelle, provides similar testimony that is in contradistinction from the ’294 patent, testimony that effectively reads out water submersion embodiments from the meaning of “waterproof.” *See* Ex. 2002 ¶ 59 (Mr. Credelle stating that “Patent Owner’s proposed construction [does] not require waterproofing under conditions such as submersion in water.”). Further, Patent Owner’s argument misconstrues Petitioner’s claim construction as “preventing [*all*] water from entering (the panel).” *See* PO Resp. 23 (Patent Owner arguing that Petitioner’s “proposed construction for

‘waterproof’ requires absolute protection against water, regardless of whether it is exposed to the weather.”). Neither Petitioner, nor Mr. Flasck, argue that Petitioner’s proposed construction of “waterproof” *requires* the display be submersible, only that a person of ordinary skill in the art would understand that “waterproof” includes a range of waterproof levels. *See, e.g.,* Ex. 1005 ¶ 58 (Mr. Flasck testifying that “IP 65 indicates a dust-tight enclosure that is waterproof against jets of water; and IP 68 indicates a dust-tight enclosure that is waterproof against continuous immersion in water.”).

It is not disputed that the meaning of “waterproof” includes, “when exposed to weather” but according to the ’294 patent, “waterproof” can encompass conditions different from normal weather, e.g., submersion in water. *See* Ex. 1001, 5:57–59. *See also Phillips*, 415 F.3d at 1323 (citations omitted) (explaining that “although the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments”). Indeed, if the applicant of the ’294 patent had intended to constrain the term “waterproof,” it surely understood how to do this where, for example in related US Patent No. 9,990,869 B1 (“the ’869 patent”), dependent claims 5, 6, and 7 further limit “waterproof” of the modular display panel to specific IP ratings. *See, e.g.,* Ex. 3001, 32:16–17 (Claim 5 reciting “[t]he panel of claim 3, wherein the panel comprises an ingress protection (IP) rating of IP 65.”).⁸

Accordingly, we determine that a person of ordinary skill in the art would understand that “waterproof” and “sealed to be waterproof” mean

⁸ The ’869 and ’294 patents are related as continuations of Application No. 15/369,304, filed on Dec. 5, 2016, now Pat. No. 9,916,782. Ex. 1001, Code (63). We have entered the ’869 patent in this proceeding as Exhibit 300.

“preventing water from entering the interior of the panel.” We acknowledge that our claim construction for “waterproof” differs from the District Court’s construction. *See* Ex. 1019, 23 (The District Court determining “waterproof” to mean “ingress protection (IP) rating of IP 65 or higher”) (emphasis omitted). Yet, neither Petitioner nor Patent Owner argued that we should apply the District Court’s Construction in this proceeding. Here, we have applied *Phillips* in construing the phrase “waterproof” and thus the same claim construction standard used in a civil action. In doing so we have considered, and given the District Court’s claim construction appropriate weight. Based on the parties proposed constructions and arguments in this proceeding, as well as the written description of the ’869 patent that does not limit the term “waterproof” to a specific IP range, we come, respectfully, to a different construction. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide (CTPG), November 2019, pp. 46–47 (quoting 37 C.F.R. § 42.100(b)).

III. DISCUSSION

A. *Legal Principles of Anticipation*

To anticipate a patent claim under 35 U.S.C. § 102, “a single prior art reference must expressly or inherently disclose each claim limitation.” *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). Under the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates. *MEHL/Biophile Int’l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999) (citation omitted); *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349–50 (Fed. Cir. 2002).

B. *Legal Principles of Obviousness*

A patent claim is unpatentable under 35 U.S.C. § 103(a) if the

differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware*, 800 F.3d at 1378 (discussing the burden of proof in *inter partes* review).

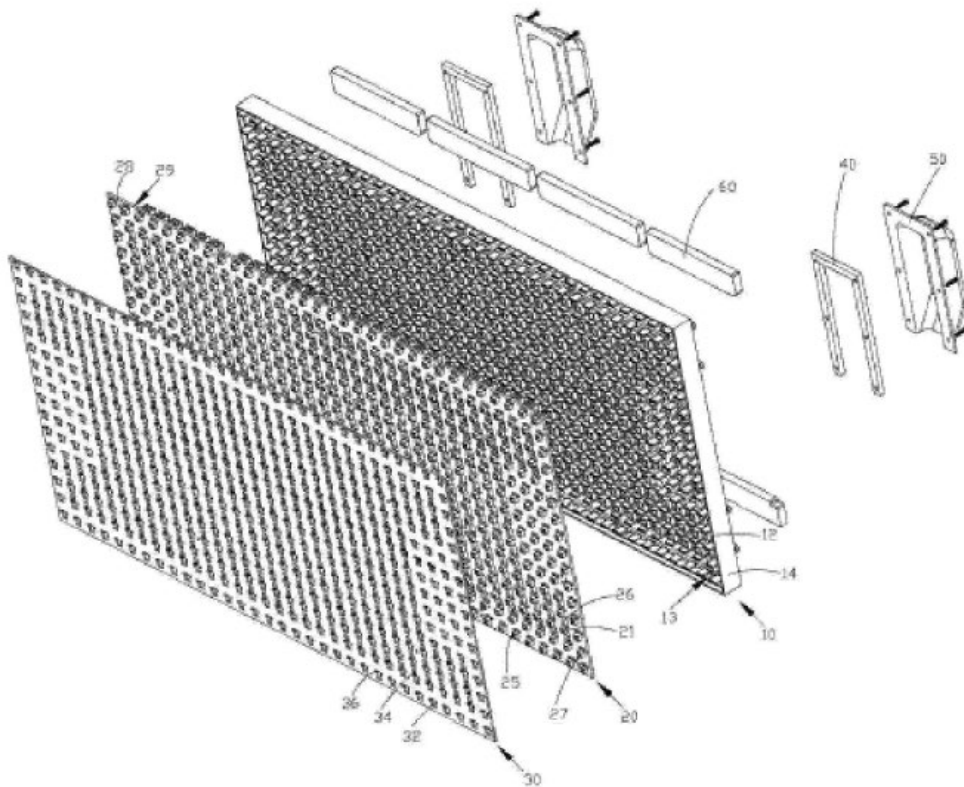
C. Anticipation of Claims 1, 2, 9, 13, and 20 over Guoshi (Ground 1)

On the complete record now before us, Petitioner has established by a preponderance of the evidence that claims 1, 2, 9, 13, and 20 are anticipated for the reasons explained below.

1. Guoshi (Ex. 1008)

Guoshi is a Chinese patent publication (Ex. 1007), and we rely on the certified translation of Guoshi (Ex. 1008) provided by Petitioner. Pet. 13. Like the ’869 patent, Guoshi is directed to LED displays “composed of multiple LED display modules connected together.” Ex. 1008 ¶ 5. Figure 4

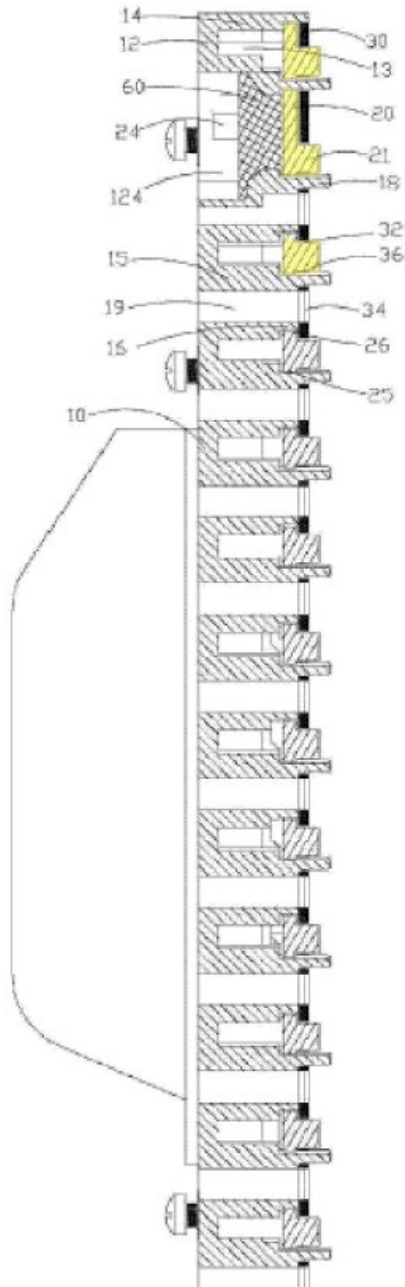
from Guoshi, depicting an exploded view of LED display module 1, is reproduced below.



Drawing 4

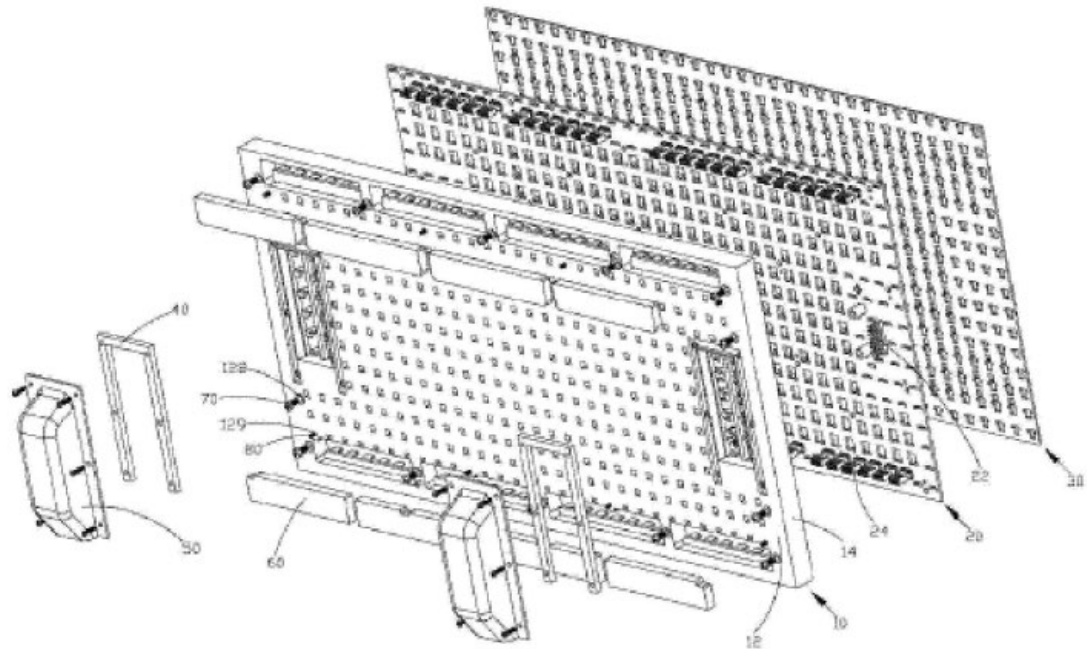
Guoshi's Figure 4, above, depicts a front exploded view of LED display module 1 including, *inter alia*, sealing layer 30, printed circuit board 20, base 10 having main body 12 and side walls 14, and on the rear of main body 12 are waterproof covers 50. *Id.* ¶¶ 27, 33.

A partial cross-sectional view of display module 1, as annotated by the Board, from Guoshi's Figure 3 is shown below.



Guoshi's annotated and partial cross-sectional view of Figure 3, above, illustrates printed circuit board 20 and LED's 21 highlighted in yellow, and base 10 having sidewalls 14 and brims (louvers) 18 between adjacent rows of LED's. *Id.* ¶ 31.

Guoshi's Figure 5 is reproduced below.



Drawing 5

Guoshi's Figure 5, above, depicts a rear exploded view of an LED display module including, *inter alia*, power module 22 and cooling elements 24 on the back side of printed circuit board 20, and a recess or hole 120 formed in base 10 for receiving power module 22, and intended to be covered by waterproof covers 50. *Id.* ¶¶ 27, 30.

Guoshi explains that LED's 21 are powered and controlled by power module 22 and a control module where "the control module controls the brightening and dimming of LED lights in the corresponding areas of the display module to display content such as text, images, and videos; and the power module converts the input voltage/current into the voltage/current required by the display." *Id.* ¶ 2.

Guoshi teaches that because these type of displays are often used outdoors, "[t]hey have certain wind resistant, rain resistant, and waterproof functions. They are mainly used for outdoor advertisements, train/bus stations, city plazas, and shopping centers." Ex. 1008 ¶ 4. To protect the

displays, Guoshi discloses a silicone sealing layer where “sealing layer (30) . . . achieves the effect of waterproofing by using the sealing layer (30) to seal the circuit board (20) inside the housing cavity (13), with a waterproofing level higher than IP65.” *Id.* ¶ 27. Guoshi also teaches that by using waterproof covers 50 and sealing strips 40 on the rear of the LED display module, the display can be sealed “so that the waterproofing level reaches above IP64.” *Id.* ¶ 28.

2. *Analysis of Claim 1*

Considering the elements of claim 1 we address below the respective arguments of both parties as to claim 1.

a) *Petitioner’s Arguments*

A modular display panel comprising:

Petitioner argues that Guoshi discloses all the limitations of claim 1, starting with “[a] modular display panel” as recited in the preamble. Pet. 17. Guoshi, Petitioner argues, describes that “[t]his invention belongs to the technical field of displays, in particular LED display modules and LED displays.” *Id.* (citing Ex. 1008 ¶ 1).

a first side and a second side opposite to the first side, wherein the first side of the modular display panel comprises a display surface of the modular display panel;

Petitioner argues that “each of Guoshi’s LED display modules has a front (first) side where several LED units form a display surface, and a rear (second side).” *Id.* at 18 (citing Ex. 1005 ¶¶ 91–92; Ex. 1008 ¶ 21–22, Figs. 4–5).

attachment points for use in attachment as part of a multi-panel modular display;

According to Petitioner, “Guoshi’s modules all include a screw and hole configuration that directly attaches them to a case (*i.e.*, a frame).” *Id.* at 20 (citing Ex. 1005 ¶¶ 95–96; Ex. 1008 ¶ 40, Fig. 8).

a plastic casing comprising an outer surface of the modular display panel, the outer surface being part of the second side of the modular display panel;

Petitioner argues that “Guoshi describes an LED display module having a plastic base (*a plastic casing*) having sidewalls and two surfaces, where the outer surface of the base forms a part of the rear (*second*) side of the LED module.” *Id.* at 21 (citing Ex. 1005 ¶¶ 99–100; Ex. 1008 ¶¶ 5, 27).

a recess disposed in the plastic casing;

Petitioner argues that Guoshi discloses “a recess” where it describes “[t]he main body (12) and the side wall (14) form the housing cavity (13) for housing the circuit board (20).” *Id.* at 22 (citing Ex. 1008 ¶ 27; Figs. 4 and 5).

a printed circuit board disposed in the recess;

Petitioner argues that Guoshi “describes a circuit board housed in the cavity of the base of the LED display module.” *Id.* at 23 (citing Ex. 1005 ¶¶ 106–107).

a plurality of LEDs arranged as pixels attached to a front side of the printed circuit board, wherein the pixels are arranged in a rectangular array comprising at least fifty pixels;

For the specific LED and pixel limitations, Petitioner argues that “Guoshi describes and depicts an array of at least 50 LED units attached to the front side of its circuit board, . . . used for light emitting display.” Pet. 24 (citing Ex. 1008 ¶ 27; Ex. 1005 ¶¶ 109–110).

a framework of louvers disposed over the front side of the printed circuit board between rows of the plurality of LEDs;

Petitioner points out that Guoshi discloses brims 18, i.e, louvers, for shading the LEDs positioned over the printed circuit board and between the rows of LEDs. Pet. 25–26 (citing Ex. 1005 ¶¶ 113–114; Ex. 1008 ¶¶ 34, 37, Figs. 2–6).

a circuit for controlling the plurality of LEDs, the circuit being attached to the printed circuit board;

Petitioner argues that Guoshi discloses a circuit for controlling the LEDs, i.e., “a control module,” and as to the location of the control module, points out that Guoshi specifically describes, “the control module (not shown) that is above the second surface (29) and that is used to control the brightening and dimming of LED light emitting units (21).” *Id.* at 27 (quoting Ex. 1008 ¶ 27) (emphasis omitted). Petitioner’s declarant, Mr. Flasck, explains that in context of Guoshi’s translation, based on the word “above,” a person of ordinary skill in the art “would readily understand that this is Guoshi’s way of saying the control module is attached directly, both physically and electrically, to the circuit board (20).” Ex. 1005 ¶ 119.

a power supply for powering the plurality of LEDs;

Petitioner asserts that “Guoshi discloses that the LED display modules contain ‘a power module used for power supply voltage.’” Pet. 28 (citing Ex. 1005 ¶¶ 122–123; Ex. 1008 ¶ 7).

wherein the front side of the printed circuit board is sealed to be waterproof and the plastic casing is sealed to be waterproof so that the modular display panel is sealed to be waterproof; and

Petitioner argues that “Guoshi describes sealing the entire LED display module to be waterproof . . . sealing the front of its panel at above IP65 and the rear of its panel above IP64.” *Id.* at 29 (citing Ex. 1005 ¶¶ 125–126) (emphasis omitted).

wherein the modular display panel is configured to be exposed to an external environment without a protective waterproof enclosure.

Petitioner points out that Guoshi teaches use of a silicone sealing layer 30 as opposed to an enclosure, and in this way is ““suitable for use in outdoor environments. The LED display modules (1) have good waterproofing and fast cooling functions, so it can effectively guarantee the usage performance of the LED display.”” Pet. 31–32 (citing Ex. 1008 ¶ 40, Fig. 8). Mr. Flasck testifies that “to achieve waterproofing at a level above IP64, Guoshi uses sealants and not enclosures.” Ex. 1005 ¶ 132. As such, Guoshi’s LED module (1) (*modular display panel*) “*is configured to be exposed to an external environment without a protective waterproof enclosure.*” *Id.*

b) Patent Owner’s Arguments

Patent Owner addresses both the anticipation and obviousness challenges, essentially together, with a number of arguments in support of its position that Petitioner allegedly has not proved invalidity of the challenged claims by a preponderance of the evidence. PO Resp. 15–55.

First, Patent Owner argues that, under the proper claim construction, “modular display panel” does not include a “cabinet.” *Id.* at 18–19 (citing Ex. 2002 ¶ 56; Ex. 1019, 18; Ex. 1021). Therefore, Patent Owner contends, Guoshi does not disclose a “modular display panel” because Guoshi discloses a “cabinet.” *Id.* at 19–20 (citing Ex. 1008 ¶ 5, 40; Ex. 2002 ¶ 57). Patent Owner argues specifically that Guoshi’s Figure 8 illustrates case 2, that case 2 is a “cabinet”, and that “the case (2) of Guoshi is described as ‘encasing the LED display modules,’ which means it *provides protection to*

the LED panel(s) from the environment, including water.” Id. at 20 (citing Ex. 1021; Ex. 2002 ¶ 58).

Second, Patent Owner argues that the Petition fails to provide a meaning for the term “waterproof” and, therefore, Petitioner has not satisfied the requirements of 37 C.F.R. § 42.104(b)(3) and set forth “[h]ow the challenged claim is to be construed.” 37 C.F.R. § 42.104(b)(3); *see* PO Resp. 21–26. In addition, Patent Owner argues that under any of the proposed constructions, even the plain and ordinary meaning asserted in the Petition, that Petitioner “ha[s] not explained how the IP 64 rating of Guoshi meets any claim construction” for the term “waterproof.” *Id.* at 26 (emphasis omitted).

Third, Patent Owner argues that Guoshi fails to disclose a “*plastic casing comprising an outer surface of the modular display panel, the outer surface being part of the second side of the modular display panel, as recited in the challenged claims.*” *Id.* at 29. Patent Owner contends that reliance on the single disclosure in Guoshi of a “plastic base” is error because “Guoshi clearly never referred to his base (10) as plastic, and indeed discussed in the background section how his invention was to overcome the issues of a prior art display that had a plastic base.” *Id.* at 31.

Fourth, Patent Owner argues that Guoshi fails to disclose a control circuit for the LEDs that is “attached to the circuit board” as called for in claim 1. *Id.* at 32. Patent Owner argues specifically that Guoshi’s recitation, and Mr. Flasck’s reliance on, the term “above” is insufficient to teach that the control module is “physically attached” to the printed circuit board. *Id.* at 33.

Fifth, specifically as to obviousness, which is addressed below with respect to Petitioner’s second and third challenges, Patent Owner argues that

the combination of Guoshi and Kim is based on improper hindsight and that “[a] person of ordinary skill in the art would not have attempted and/or understood to modify the internal power supply of Guoshi with the external power supply of Kim.” *Id.* at 45. Patent Owner argues specifically that “a POSITA would not have been motivated to modify Guoshi in view of Kim because Kim explicitly teaches away from mounting a power supply to a plastic casing like Guoshi’s.” *Id.* (citing Ex. 1010, p. 3, ¶ 11; Ex. 2002 ¶ 96).

For purposes of the anticipation challenge in view of Guoshi, we address the first four main arguments relevant to anticipation of claims 1, 2, 9, 13, and 20.

c) Whether Guoshi’s Case 2 is a Cabinet

Patent Owner argues that Guoshi’s case 2, is a cabinet, and therefore Guoshi does not disclose a “modular display panel” as claimed. PO Resp. 18–21. We disagree for the following reasons.

There is no dispute that the meaning of “modular display panel” does not include a cabinet. *See* Tr. 12:22–23 (Petitioner’s counsel explaining that “the parties agree that the display module of the challenged claims do not employ a cabinet.”), *see also* PO Resp. 18 (Patent Owner arguing that “the plain meaning of the claimed ‘modular display panels’ prohibits cabinets”). Therefore, as discussed above in our claim construction, “modular display panel” means “interchangeable display panel for a multi-panel modular display configured for use without a cabinet.” *See* Section II.A.

There is, however, a dispute as to whether or not Guoshi discloses a modular display panel in a cabinet.

Patent Owner argues that considering Figure 8 of Guoshi, “Guoshi’s panel design is clearly a **cabinet** modular display that is not within the scope

of the claimed ‘modular display panel.’” PO Resp. 20 (citing Ex. 2002 ¶ 57). Patent Owner provides the following annotated Figure 8, reproduced below, adding the word and highlighting what it refers to as the “cabinet.” *Id.* at 20.

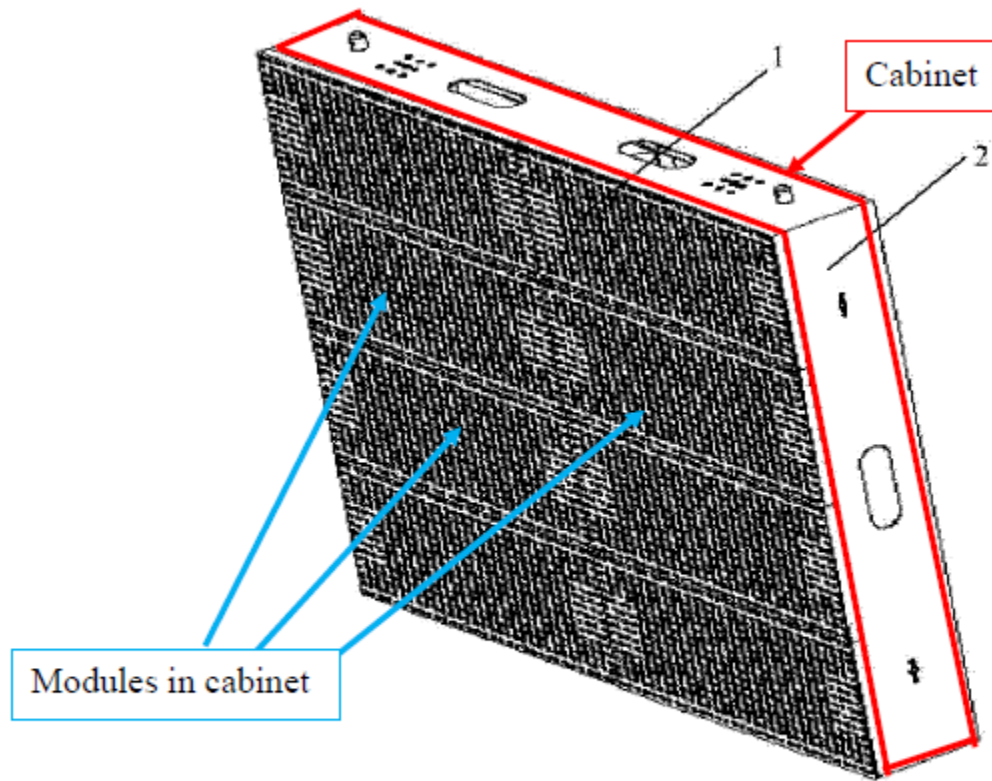


图 8

Figure 8 of Guoshi, above, as annotated by Patent Owner to indicate a cabinet enclosing the modular display. To support its position that Guoshi’s case 2 is a cabinet, Patent Owner argues that Guoshi describes case 2 as “encasing the LED display modules.” *Id.* (citing Ex. 1021; Ex. 2002 ¶ 58).

Petitioner argues to the contrary that, despite Guoshi’s use of the word “encasing,” “there is no disclosure in Guoshi of the elements required to enclose LED displays in a cabinet.” Reply 3. Petitioner points out that in his declaration, Patent Owner’s Declarant, Mr. Credelle, explained “that a

cabinet has access doors and includes ‘active cooling units (e.g., air conditioning or fans).’” *Id.* (citing Ex. 1027, 17:17–18:11; Ex. 2002 ¶ 33). Petitioner argues that nowhere in Guoshi is it described “that Guoshi’s LED display module is fully enclosed, has a door, or includes any active cooling features, like air conditioning units or fans.” *Id.* at 4 (citing Ex. 1008 ¶¶ 21–22; Figs. 4–5).

For the reasons that follow, we are persuaded that Guoshi does not disclose a cabinet encasing the plurality of LED display modules.

Arguably Guoshi describes in its “Technology Background” section that it was known to protect an LED display and “[a] waterproofing effect can be achieved simply by sealing it in a case.” Ex. 1008 ¶ 5. However, we are not persuaded that Guoshi’s background section describing the sealing of a LED display in a case means that the later description of Guoshi’s case 2 is a cabinet. Contrary to Patent Owner’s interpretation of Guoshi, the written description of Guoshi’s novel LED display module focuses on waterproofing and protecting the LED display module *without* a case or cabinet. For example, Guoshi explains in its “Device Details” section that “[t]he purpose of this device is to provide *an LED display module* for the purpose of solving problems with the existing technology such as the smoothness, waterproofing, and effective heat dissipation of LED display modules.” *Id.* ¶ 6 (emphasis added). Guoshi describes sealing the LEDs and housing body on the front of the display module by “pouring sealant that is poured on the circuit board and that fills the housing cavity.” *Id.* ¶ 7. Guoshi further describes that on the back of the display module, “[t]he LED display module also includes waterproof covers that are situated above the first receiving holes and sealing strips that are contained inside the receiving grooves and that are located between the waterproof covers and the main body.” *Id.* ¶ 9.

In addition, Guoshi describes that on the back of the display module, “[t]he LED display module also includes cooling units that run along the second receiving holes and that are exposed on the base and sealant that is situated inside the second receiving holes to seal the cooling units.” *Id.* ¶ 10.

Guoshi’s description of the waterproof display module is substantially different from what Mr. Credelle clearly explained in his declaration as the structure of a cabinet. Mr. Credelle describes that a typical cabinet

includes a front side with LEDs, metal sides, and a rear side with doors. The LEDs and PCB are protected on the front exposed side with potting material to achieve waterproof capability. The doors have vents to allow air flow to cool the interior components and the modular display includes fans. In the photo with the door opened, the printed circuit boards (PCBs) can be seen within the cabinet. *They are clearly not sealed to be waterproof without the use of the metal cabinet.*

Ex. 2002 ¶ 33 (referencing photos in Mr. Credelle’s Declaration as Liantronics PH16) (emphasis added). On its face, as discussed above, there is no description or discussion in Guoshi of a cabinet with doors that actually encloses the novel display modules. Indeed, Guoshi’s entire description is focused on waterproofing the printed circuit board and LEDs within housing cavity 13, with no mention of a cabinet. *See* Ex. 1008 ¶ 27 (“The LED display module (1) provided in the implementation example of this device . . . achieves the effect of waterproofing by using the sealing layer (30) to seal the circuit board (20) inside the housing cavity (13), with a waterproofing level higher than IP65.”).

Although Mr. Credelle continued to advocate that the term “encasing” in Guoshi means a complete enclosure with doors, upon cross-examination Mr. Credelle stated “I have no knowledge of what the back comprises because it wasn’t described in Guoshi.” Ex. 1027, 28:15–17. Based on all

the evidence now before us, and reading Guoshi in context, we determine that even considering the word “encasing,” Guoshi’s written description unambiguously teaches waterproofing and cooling of the display module incorporated in the display module itself, and not as Patent Owner alleges that the display modules are protected inside a waterproof cabinet structure. Ex. 1008 ¶¶ 6–12.

Accordingly, we determine that Guoshi does not disclose a cabinet, but simply case 2, as shown in Figures 1A, and 8, and that Guoshi therefore discloses “a modular display panel” within the claim construction agreed upon by the parties. *See* Section II.A. (The parties agreeing that “modular display panel” means “interchangeable display panel for a multi-panel modular display configured for use without a cabinet.”)

d) Whether Petitioner has Shown that Guoshi Discloses the Modular Display Panel is Sealed to be Waterproof

We determined in our claim construction that “waterproof” and “sealed to be waterproof” mean “preventing water from entering the interior of the panel.” Section II.B.

Patent Owner argues that Petitioner “**ha[s] not explained how the IP 64 rating of Guoshi meets any claim construction.**” PO Resp. 26 (emphasis in original). Patent Owner further argues that Mr. Flasck’s testimony is unreliable because during his deposition, Mr. Flasck “stated that there is no intermediate level between IP 64 and IP 65. Mr. Flasck is incorrect, as there are intermediate levels of IP protection between IP64 and IP65.” *Id.* at 27 (citing Ex. 2002 ¶ 66; Ex. 2004, 74:18–75:3). For several reasons we disagree with the premise of both these arguments.

In its Petition, Petitioner relied upon the express disclosure of Guoshi, as well as testimony from Mr. Flasck, that the front of Guoshi’s LED display module has “a waterproofing level higher than IP65” and, for the back of Guoshi’s LED display module, the “waterproofing level reaches above IP64.” Pet. 29–30 (citing Ex. 1008 ¶¶ 27, 30; Ex. 1005 ¶¶ 126–128). As discussed in our claim construction, the term “waterproof” encompasses a range of IP values. In this proceeding, the correct claim construction is not limited to any particular IP value or range of values. And, regardless of whether there are IP values between IP64 and IP65 as Patent Owner contends, the Petition described and cited the express disclosure of Guoshi that teaches waterproofing a modular display. *See, e.g.*, Pet. 30 (“Guoshi uses waterproof covers and specialized sealing means to ‘it effectively guarantees the waterproof performance of the LED display module (1) so that the waterproofing level reaches above IP64.’”) (citing Ex. 1008 ¶ 30, Fig. 5; Ex. 1005 ¶ 128). Indeed, even under Patent Owner’s proposed construction for “waterproofing,” that is “preventing water from entering the interior of the panel when exposed to weather,” (which also does not include an IP value or range of IP values) we would still find that Petitioner has sufficiently explained where, and how, Guoshi teaches various levels of waterproofing for LED display modules.

Finally, even if Mr. Flasck was unaware of the IP64K intermediate level between IPR 64 and IP65 and DIN 40050 part 9, we do not find that this argument impugns his testimony. *See* Ex. 2006 (Hella Marine referencing DIN40050 (Ex. 1030)). Mr. Flasck’s testimony is consistent that “Guoshi teaches sealing the front of its panel at **above** IP65 and the rear of its panel **above** IP64.” Ex. 1005 ¶ 126. Considering the complete record now before us, we find Petitioner’s evidence and arguments persuasive that

Guoshi teaches an LED display module that is sealed to be waterproof by “preventing water from entering the interior of the panel.”

e) Whether Guoshi Discloses a “Plastic Casing Comprising an Outer Surface of the Modular Display Panel, the Outer Surface Being Part of the Second Side of the Modular Display Panel”

Patent Owner argues that Guoshi fails to disclose the limitations of a “plastic casing comprising an outer surface of the modular display panel, the outer surface being part of the second side of the modular display panel,” as recited in claim 1. PO Resp. 29–32. Patent Owner argues that Guoshi only mentions the word “plastic” one time, and that Petitioner’s expert, Mr. Flasck, agrees there is only one mention of “plastic” in Guoshi. *Id.* at 30 (citing Ex. 2004 at 53:3–11). Patent Owner argues specifically that, “Guoshi’s use of the term ‘plastic base’ in the technology background section but not in the remainder of the publication is strong evidence that Guoshi knew of a plastic base, but intentionally did not design his own invention with a plastic base. *Id.* at 31 (citing Ex. 2002 ¶ 74).

Besides pointing out in its Petition that Guoshi expressly states that a plastic base was known and conventional in the prior art, Petitioner argues that the point of novelty in Guoshi was not directed to an improved base. Pet. 21 (citing Ex. 1005 ¶¶ 99–100); Reply 14. Petitioner contends that the absence of disclosure relating to different or improved materials for a base in Guoshi would have indicated to a person of ordinary skill in the art “that the base 10 disclosed in Guoshi could be a conventional plastic base.” Reply 14 (citing Ex. 1008 ¶ 27).

We find Petitioner’s evidence and arguments on this issue the most persuasive. First, Guoshi expressly states that “[a]n LED display module generally includes a plastic base, a circuit board, and LED lights set up on

the circuit board.” Ex. 1008 ¶ 5. From this evidence it is reasonable to understand that a person of ordinary skill in the art understood that plastic bases would have been used to support a circuit board and LED lights as a display module. *See Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368, 1379 (Fed. Cir. 2001) (explaining that “anticipation does not require actual performance of suggestions in a disclosure,” instead “anticipation only requires that those suggestions be enabling to one of skill in the art”). Mr. Flasck also provides unrebutted testimony that “[p]rior to 2013, the use of plastic bases in assembly of LED display panels was well-known.” Ex. 1005 ¶ 100; *see also* Ex. 2010, 56:9–58:16 (Mr. Flasck testifying during his deposition that, based on his experience, the use of a plastic base was well known in the art.).

Second, Guoshi clearly describes an embodiment having base 10 including sidewalls 14 and main body 12 (rear surface), defining cavity 13 (front surface) for housing the circuit board. Ex. 1008 ¶ 27. Acknowledging that base 10 itself is not described explicitly in the Specific Implementation section of Guoshi as, “plastic,” it is not, however, a challenge for a person of ordinary skill in the art to have understood and recognized that Guoshi disclosed its base 10 was made of plastic. Notably, Guoshi’s written description does not reveal any other material for a base, and thus, plastic is essentially the only material that Guoshi reveals. *Id.* ¶ 5. Indeed, as Petitioner points out, Kim similarly describes a plastic base or frame 121 for supporting circuit board 123. *See* Ex. 1010, 3 (Kim describing that “the conventional LED module 120 is constituted of a plastic frame 121, and a circuit board 123 attached to the front surface of the frame 121”).

Thirdly, we do not find compelling Patent Owner’s expert testimony from Mr. Credelle disputing that Guoshi’s “plastic base” disclosure does not

disclose to a person of ordinary skill in the art the nature of Guoshi's plastic base 10. PO Resp. 31–32 (citing Ex. 2002 ¶ 75). Mr. Credelle testifies that “Guoshi does not make clear that the ‘plastic base’ of the prior art display module is even the same component as the base 10 of the disclosed invention.” Ex. 2002 ¶ 74. And, for example, Mr. Credelle also testifies that “I note that Guoshi does not state that the prior art plastic base is an external casing.” *Id.* ¶ 75. These statements by Mr. Credelle, as written, may be nominally true. This testimony, however, fails to recognize that Guoshi expressly described a base made of plastic and no other material. Anticipation is determined when the limitation is found “either expressly described or under principles of inherency, in a single prior art reference, or that the claimed invention was previously known or embodied in a single prior art device or practice.” *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771 (Fed. Cir. 1983), *overruled on other grounds by SRI Int'l v. Matsushita Elec. Corp. of Am.*, 775 F.2d 1107 (Fed. Cir. 1985). Based on the complete evidence now before us, we give more weight to Mr. Flasck's testimony—namely that a person of ordinary skill in the art understood Guoshi to disclose “Guoshi's plastic base (10) having the cavity (13) for housing the circuit board is a *plastic casing*.” Ex. 1005 ¶ 101.

In light of our determinations that Guoshi discloses a plastic base and, as discussed previously, does *not* disclose a cabinet, we also find persuasive Mr. Flasck's testimony that Guoshi's “FIG. 5 [] shows that the base (10) (*plastic casing*) has an outer surface that forms a part of the rear (*second*) side of the LED module.” *Id.* We reproduce Guoshi's Figure 5 below, as annotated by Mr. Flasck.

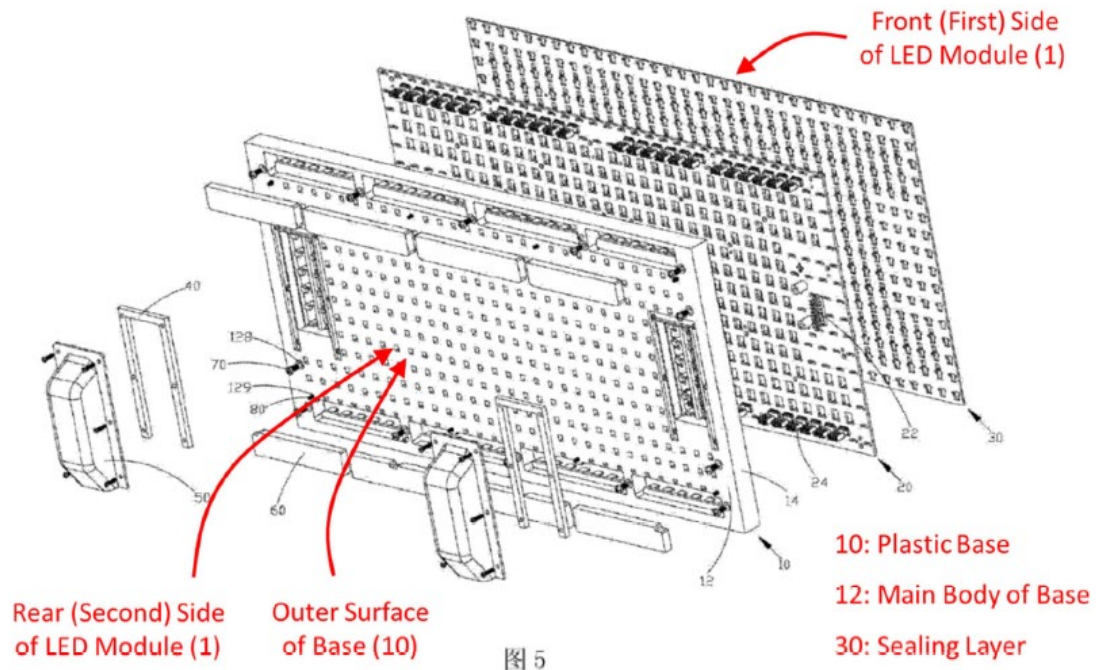


Figure 5 of Guoshi is shown above, including Mr. Flasck's annotations indicating the front and rear sides of the LED Module 1, and the rear side including outer surface of base 10. Mr. Flasck's testimony is consistent with Figure 5 showing that, absent a cabinet, it is reasonable to understand that outer surface of base 10 would be a part of the rear, second side of the modular display. Also, Mr. Flasck's analysis of Guoshi's Figure 5 is consistent with the additional written description of waterproof covers 50 and sealing strips 40 supported on the outer surface of base 10 to protect power module 22 inside receiving holes 120 from any external environmental effects. Ex. 1008 ¶ 30. As a whole, the evidence and testimony of record persuades us that Guoshi discloses not only a "plastic base," but also that the plastic base is *not* enclosed in a cabinet, and includes "an outer surface of the modular display panel, the outer surface being part of the second side of the modular display panel." Ex. 1001, 32:14–16.

f) Whether Guoshi Fails to Disclose “a Circuit For Controlling the Plurality of LEDs, the Circuit Being Attached to the Printed Circuit Board

Patent Owner makes several arguments regarding the structural position of the control circuit for Guoshi’s LEDs. PO Resp. 32–44. Patent Owner contends that neither Guoshi’s written description, nor its drawings, explain where the control circuit is positioned on, i.e., attached to, the printed circuit board. *Id.* at 33. Patent Owner argues also that Guoshi’s description of “the control module (not shown) that is *above* the second surface,” (Ex. 1008 ¶ 27) does not mean that the control circuit/module is physically attached to the printed circuit board. *Id.* at 34 (citing Ex. 2002 ¶ 81) (emphasis added).

Contrary to Patent Owner’s argument, the written description of Guoshi fairly explains that the LEDs are attached on one side, and the power and control modules are attached on the other, i.e. first and second, sides of the printed circuit board. Ex. 1008 ¶ 27. Guoshi states that “[t]he LED light emitting units (21) and the power module (22) are separately situated on the two opposite surfaces of the circuit board (20).” *Id.* Guoshi describes further that “[t]he LED light emitting units (21) are situated on the first surface (28), and the power module (22) and control module are both situated above this second surface (29) *and fit with the main body (12).*” Reading this description as a whole, we find Guoshi’s description straightforward. Given a plain and ordinary reading of this description we understand that Guoshi’s LEDs are “attached to a first side of the printed circuit board,” and on the opposite side that the power and control module are also “attached to the printed circuit board,” and within “a recess” of the casing as recited in claim 1. Also, there is no dispute that Guoshi teaches the

power module 22 and control module are located together. *See* PO Resp. 34 (Patent Owner stating that “the power module and control module are situated together in the same location.”). The dispute is mainly about *where* these components are located.

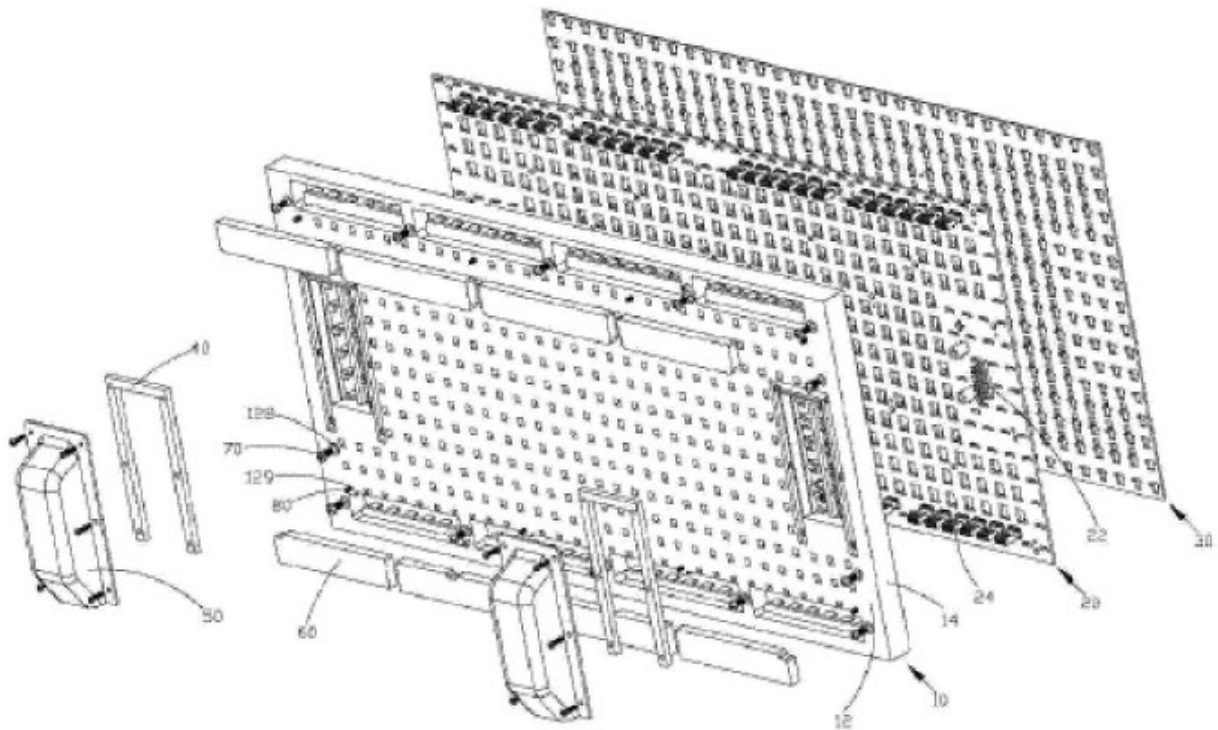
We appreciate that Guoshi’s description states that the LEDs and power and control modules are “situated on,” and in some cases, “above,” rather than “attached,” but we are not apprised by a persuasive argument or evidence that these terms mean that such components would not have been understood by a person of ordinary skill in the art as attached to the circuit board.

Considering Guoshi’s written description in more detail, Guoshi describes in the following paragraph that all the elements, LEDs, power module, and control module, are “above” the respective first and second sides of the printed circuit board:

[t]he LED light emitting units (21) are situated at intervals *above* the circuit board (20) and protrude from the sealing layer (30). The circuit board (20) includes the first surface (28) that is relative to the sealing layer (30), the second surface (29) that is relative to the first surface (28), and the control module (not shown) that is *above* the second surface (29) and that is used to control the brightening and dimming of LED light emitting units (21). The LED light emitting units (21) are situated on the first surface (28), and the power module (22) and control module are both situated *above* this second surface (29) and fit within the main body (12).

Ex. 1008 ¶ 27 (emphasis added). Patent Owner argues that Guoshi’s use of the word “above” does not inform one of ordinary skill in the art that the power and control module are mounted on, or “attached” to, the printed circuit board as claimed. PO Resp. 33–34. We do not find Patent Owner’s interpretation of the specification persuasive because consistent with

Petitioner's evidence and Mr. Flasck's testimony, Guoshi's Figure 5, reproduced below, shows power module 22 mounted on printed circuit board 20.

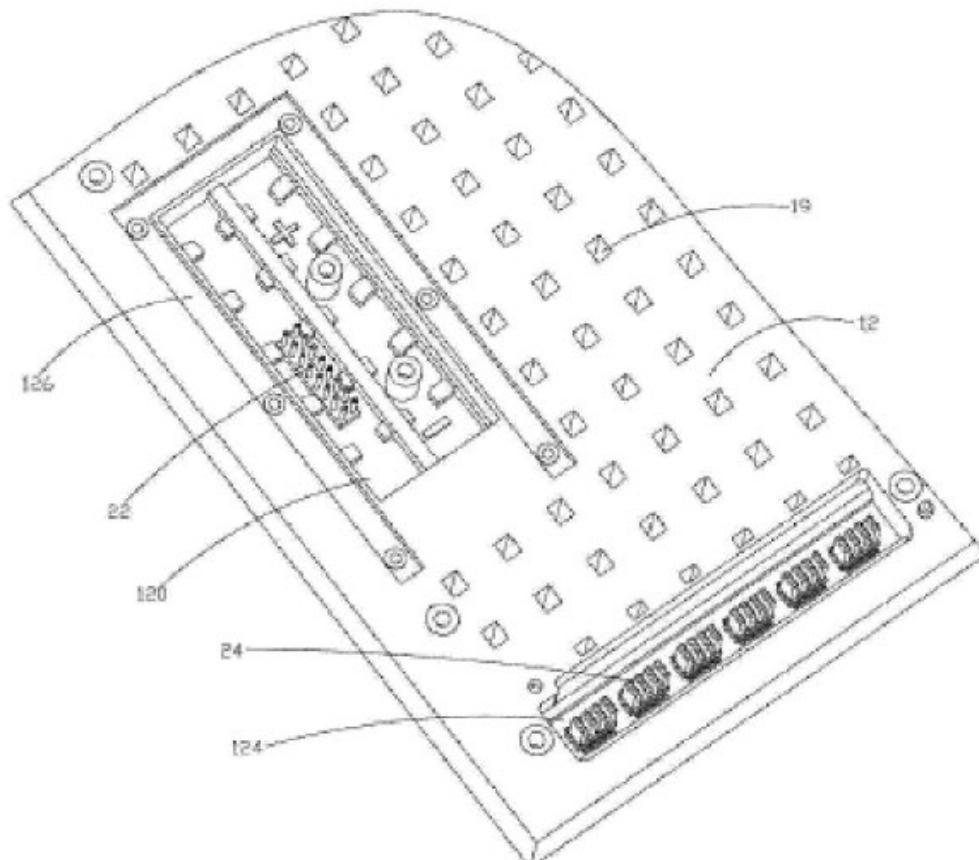


Drawing 5

Guoshi's Figure 5 above illustrates printed circuit board 20 having power module 22 mounted on the printed circuit board. Also, Guoshi's written description explicitly states that "[t]he circuit board (20) *includes* the first surface (28) that is relative to the sealer layer (30), the second surface (29) that is relative to the first surface (28), *and the control module (not shown)* that is above the second surface (29) and that is used to control the brightening and dimming of LED light emitting units (21)." Ex. 1008 ¶ 27. We are persuaded that a plain reading of this description, and the phrase "the circuit board includes," along with the rest of the written description

sufficiently describes the control module and the power module as “attached to the circuit board.”

Patent Owner argues further that Guoshi’s Figure 7, reproduced below, confirms its argument that the power module 22 and control module are located outside of main body 12, and not on the printed circuit board.



Drawing 7

Guoshi’s Figure 7, above, illustrates the back of main body 12 including first and second receiving holes 120, 124 through which elements of the power module, i.e., pins, and cooling units 24 extend. Ex. 1008 ¶ 31.

Patent Owner’s argument as to Figure 7 is not persuasive because considering Figures 5 and 7 together, the receiving pins of power module 22,

as well as portions of cooling units 24, extend from circuit board 20 through respective openings in the main body 12. *Id.* at Figs. 5–7. The pins of power module 22 extending through the main body 12 is not inconsistent with the power module 22 and control module being mounted on the printed circuit board. For example, Guoshi explains with respect to cooling units 24, that “[t]he cooling units (24) are situated on the second surface (29) of the circuit board (20) and are exposed on the base (10) along the second receiving holes (124) to achieve the cooling effect.” *Id.* Similarly, for the power and control module, we are persuaded by Mr. Flasck, who was asked about the pins of the power module 22 during his deposition:

Q. And have you ever known any simple pin configuration to perform any ACDC conversion or other power conversion?

[]

A. Well, as I state in Paragraph 171, in my opinion a POSITA would recognize that the power module—power modules 22 would not be just pins and would include additional power supply circuitry in the base and out of the base of the pins which are shown in Figure 7 which simply provide an electrical connection between the power supply circuitry and the circuitry on the PCB board.

Ex. 2010, 72:24–73:12. When questioned about the specific location of the power and control modules during his deposition, Mr. Flasck testified, consistently, that

the power supply and the control circuit are both situated above and [Guoshi] means on or attached to, the second surface 29. We can see 22 in Figure 5, which is the power [module] and that’s connected to the backside of the printed circuit board and [Guoshi]’s saying that although it’s not shown, likewise the control circuit is attached to the backside of the printed circuit board. So it’s not shown in Figure five but it’s described in fairly clear terms in paragraph 27.

Id. at 67:17–68:3.

The totality of the evidence best supports Petitioner’s position that Guoshi discloses “a circuit for controlling the plurality of LEDs, the circuit being attached to the printed circuit board” as called for in claim 1. As confirmed by Figures 4 and 5, Guoshi explains that “[t]he main body (12) and the side wall (14) form the housing cavity (13) for housing the circuit board (20).” Ex. 1008 ¶ 27. Thus, the circuit board 20 with its attached components including the power module 22 and control module would have been understood by a person of ordinary skill in the art to be disposed on the printed circuit board and within housing cavity 13 of main body 12. And we are persuaded, this could be so, even if pins of power module 22 extend from the printed circuit board and through main body 12. *See* Ex. 2010, 73:23–74:5. (Mr. Flasck testifying in his deposition that “the pins that are shown in Figure 7, which simply provide an electrical connection between the power supply circuitry and the circuitry on the PCB such as the LED controller and the LEDs. So the pins themselves are connectors.”).

Patent Owner further argues that “the power module and control module are both situated on the opposite side of the main body 12 from the PCB (outside of the casing) and fit within the receiving hole under the waterproof cover 50.” PO Resp. 38 (citing Ex. 2002 ¶ 86). Tellingly, Patent Owner fails to cite anything in Guoshi’s description that we find persuasive for such an arrangement. *Id.* Mr. Credelle testifies to the same arrangement, but also fails to explain or provide support from Guoshi’s written description for such an assertion. Ex. 2002 ¶ 86.

Considering the complete record of evidence and arguments of both parties with regards to the location of Guoshi’s power and control modules, we are persuaded that Guoshi fairly discloses an LED control circuit

attached to the printed circuit board and within the housing cavity 13 of main body 12, and thus meets the limitations of claim 1 for “a circuit for controlling the plurality of LEDs, the circuit being attached to the printed circuit board.” Ex. 1001, 32:26–27.

g) Conclusion as to Anticipation of Claim 1

Having considered all the evidence of record presented by both parties, we find persuasive Petitioner’s arguments and evidence, including the testimony of Mr. Flasck, and determine that Petitioner has shown by a preponderance of the evidence that claim 1 is anticipated by Guoshi.

h) Dependent Claims 2 and 9

Claims 2 and 9 each depend directly from independent claim 1. Claim 2 requires “a sealing compound disposed over the front side of the printed circuit board, wherein the front side of the printed circuit board is sealed to be waterproof.” Petitioner argues that “Guoshi describes pouring a sealant having silicone, a well-known potting material, over the front side of the circuit board to seal the front side of the circuit board, causing the LED module to be waterproof at an IP level above IP 65.” Pet. 32 (citing Ex. 1005 ¶¶ 134–135; Ex. 1008 ¶ 28).

Claim 9 recites “wherein a surface of each of the plurality of LEDs is exposed to the external environment.” Petitioner argues that “Guoshi confirms that the LEDs ‘protrude from the sealing layer (30).’” Pet. 33 (quoting Ex. 1008 ¶ 27). Petitioner asserts that “Guoshi’s FIG. 2 depicts LED units (21) protruding from the sealing layer (30), where surface of each LED unit (21) is exposed to the external environment.” *Id.* (citing Ex. 1005 ¶¶ 139–140).

Patent Owner does not specifically address nor refute Petitioner’s arguments and evidence as to dependent claims 2 and 9, relying instead on

its arguments and evidence as to independent claim 1. We find Petitioner's arguments and evidence as to these dependent claims persuasive and therefore, in light of our determination as to claim 1, also find that Petitioner has shown by a preponderance of evidence that these dependent claims are anticipated by Guoshi.

i) Independent Claim 13 and Dependent Claim 20

Independent claim 13 is similar to independent claim 1, including most of the same limitations, and further recites "the printed circuit board comprising a front side and an opposite back side, wherein the recess surrounds the opposite back side of the printed circuit board." Petitioner argues that "[t]he main body (12) surrounds the back side of Guoshi's circuit board and the sidewalls (14) wrap around the circumference of the circuit board—just as this claim element contemplates." Pet. 34–35 (citing Ex. 1005 ¶¶ 149–150). Also, Guoshi states explicitly that "[t]he main body and the side wall form the housing cavity for housing the circuit board." Ex. 1008 ¶ 7.

Claim 20 depends directly from independent claim 13, and like claim 9, recites "wherein a surface of each of the plurality of LEDs is exposed to the external environment." Petitioner argues that "Guoshi confirms that the LEDs 'protrude from the sealing layer (30).'" Pet. 33 (quoting Ex. 1008 ¶ 27). According to Petitioner, "Guoshi's FIG. 2 depicts LED units (21) protruding from the sealing layer (30), where surface of each LED unit (21) is exposed to the external environment." *Id.* (citing Ex. 1005 ¶¶ 139–140).

Patent Owner does not specifically address nor refute Petitioner's arguments and evidence as to claims 13 and 20, relying instead on its arguments and evidence as to the limitations corresponding to independent claim 1. We find Petitioner's arguments and evidence as to these claims

persuasive and therefore, in light of our determination as to claim 1, also find that Petitioner has shown by a preponderance of evidence that claims 13 and 20 are anticipated by Guoshi.

D. Obviousness of Claims 7, 18, 22–24, and 26–28 over Guoshi, Kim and Panagotacos (Ground 1)

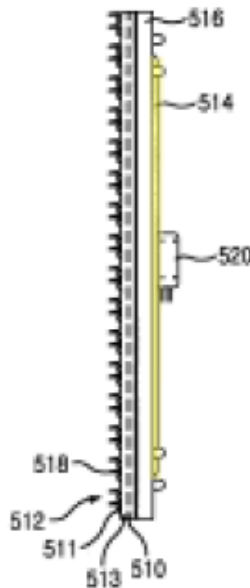
For the reasons set forth below, we determine that Petitioner has shown by a preponderance of the evidence that claims 7, 18, 22–24, and 26–28 would have been obvious in view of Guoshi, Kim, and Panagotacos.

1. Kim (Ex. 1010)

Kim is a Korean patent application publication (Ex. 1009), and we rely in this Decision on the certified translation of Kim (Ex. 1010) provided by Petitioner. Pet. 14.

Kim discloses “an ultra-thin type light emitting diode (LED) module and an ultra-thin display board using the same, wherein the rear portion of the LED module is sealed with a heat sink made of metal material, each LED module is equipped with a small power supply.” Ex. 1010, Abstract. As annotated by the Board, Figure 4c of Kim is reproduced below.

Figure 4c



Annotated Figure 4c, above, is a side view showing the configuration of an embodiment of Kim's ultra-thin LED module with heat sink 514 highlighted by the Board. Ex. 1010, 4.

Kim's ultra-thin LED module shown in the embodiment of Figures 4a–4c includes the same and similar elements as Guoshi, for instance, a circuit board 510 and a plurality of uniformly distributed LEDs 511 arranged within a grid plate 513 mounted on the front surface of the circuit board 510. *Id.* Grid plate 513 defines “a plurality of compartments 517 arranged in a uniform distribution such that the LEDs 511 form a plurality of LED pixels 512.” *Id.* at 4. On the back side of the LED module, Kim teaches an aluminum heat sink 514 (shown highlighted in yellow above) where “[a] power supply 520 for supplying a DC current is equipped on an outer wall of the heat sink 514.” *Id.* at 4:40–44. According to Kim, “since a small-capacity power supply 520 is provided at the rear of each LED module 500,

the inner space of the case 601 can be reduced in width, thereby reducing the thickness of the LED electronic signboard.” *Id.* at 5.

2. *Panagotacos (Ex. 1011)*

Panagotacos teaches a power supply for LED’s and explains that “[a]lthough the LEDs may be powered with batteries, employing commercial or residential alternating current (AC) line voltage is often more practical, and thus power supplies that convert AC line voltage into a DC voltage are desirable for powering LEDs.” Ex. 1011, 2. Panagotacos Figure 1, below, depicts one embodiment of a power supply.

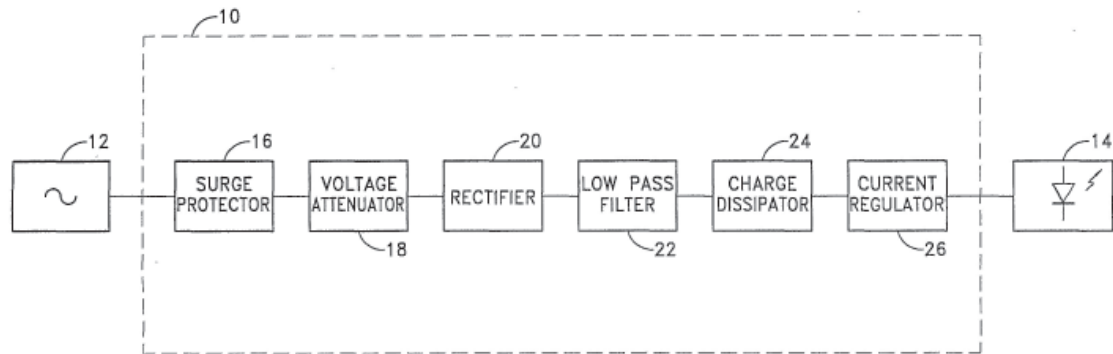


FIG. 1

Figure 1 of Panagotacos, above, is a diagrammatic representation of a power supply for converting AC to DC power, showing AC line voltage input 12 to power supply 10 including surge protector 16, voltage attenuator 18, rectifier 20, low pass filter 22, charge dissipater 24, and “current regulator 26, which provides a regulated DC current to the LEDs 14.” *Id.* at 1. In addition, Panagotacos teaches that “[p]referably, the power supply 10 is enclosed in a metal cage to isolate switching noise and electro-magnetic interference (EMI). A metal cage, known in the art as a Faraday cage, shields electronics external to the power supply 10 from signals generated by the power supply.” *Id.* at 9.

3. *Claims 7, 18, 22–24, and 26–28*

Considering the elements of claims 7, 18, 22–24, and 26–28 we address, initially, the respective arguments of both parties.

a) *Petitioner’s Arguments*

Petitioner points out that claims 7, 18, (which depend from independent claims 1 and 13 respectively) and 22 require specific power supply circuitry, specifically an AC/DC convertor. Pet. 37–38. Independent claim 22 also requires the power supply to be “mounted over the outer surface of the modular display panel.” *Id.* Claim 23 depends directly from claim 22 and further requires “a network of support structures . . . wherein the printed circuit board is attached to the plastic casing by the network of support structures.” Dependent claim 24 recites that the modular display panel is intended to be submerged in water to a depth greater than one meter.” And, dependent claims 26–28 require an AC/DC converter (claim 26) that down converts DC voltage (claim 27) and that a surface of the LEDs are exposed to the environment (claim 28).

Petitioner relies on Kim, combined with Guoshi, for teaching “an improved power configuration for multi-panel LED displays that includes completely external power supply circuitry for a Guoshi-type module.” *Id.* at 40 (citing Ex. 1005 ¶ 172). And, pointing out that neither Kim nor Guoshi expressly teaches an AC/DC converter, Petitioner relies on Panagotacos for “describ[ing] alternating current (AC) line voltage, and not batteries, as a practical source of power, e.g., due to the large power requirement of display panels, and discloses a power supply having a rectifier (i.e., an AC-DC converter).” *Id.* at 41 (citing Ex. 1005 ¶ 174; Ex. 1011, Abstract, 2:9–11, 3:30–34). Petitioner asserts that Panagotacos also discloses that it was well

known in the art to use a Faraday cage encasing the power supply. *Id.* at 42 (citing Ex. 1005 ¶ 176; Ex. 1011, 9:21–23, Fig. 1).

Petitioner argues that it would have been obvious to a person of ordinary skill in the art to combine Kim and Panagotacos with Guoshi because Kim and Panagotacos similarly describe LED display modules and “moving all power supply externally obviates the need for the relatively large ‘receiving holes (120)’” and also “to reduce LED panel thickness and weight.” *Id.* at 42–45 (citing Ex. 1005 ¶¶ 180, 186).

b) Patent Owner’s Arguments

Patent Owner does not specifically respond to Petitioner’s arguments as to the claims in this second challenge but relies, at least in part, on its arguments asserting that Petitioner has not met its burden to show that Guoshi discloses the limitations of the claims discussed with respect to anticipation. *See, e.g.*, PO Resp. 18 (Patent Owner arguing that “[t]he Challenged Claims are patentable over the prior art combinations set forth in Grounds 1 and 2 because Guoshi does not disclose the claimed ‘modular display panel.’”). Also, as it did for anticipation, Patent Owner argues that the Petition fails to provide a meaning for the term “waterproof” and, therefore, Petitioner has not satisfied the requirements of 37 C.F.R. § 42.104(b)(3) and set forth “[h]ow the challenged claim is to be construed.” *Id.* at 21–25. In addition, Patent Owner argues that under any of the proposed constructions, even the plain and ordinary meaning asserted in the Petition, that Petitioner “ha[s] not explained how the IP 64 rating of Guoshi meets any claim construction” for the term “waterproof.” *Id.* at 26 (emphasis omitted).

As it does for anticipation, Patent Owner argues that Guoshi fails to disclose “a plastic casing comprising an outer surface of the modular display

panel, the outer surface being part of the second side of the modular display panel.” *Id.* at 29–32. Patent Owner contends that reliance on the single disclosure in Guoshi of a “plastic base” is error because “Guoshi refers to the base of his invention 38 times in the publication and not once does he state that it is plastic.” *Id.* at 31.

As discussed above, Patent Owner argues that Guoshi fails to disclose a control circuit for the LEDs that is “attached to the circuit board” as called for in claim 1. *Id.* at 32. Patent Owner argues specifically that Guoshi’s use, and Mr. Flasck’s reliance on, the term “above” is insufficient to teach that the control module is “physically attached” to the printed circuit board. *Id.* at 33.

With respect specifically to the obviousness challenges, Patent Owner argues that the combination of Guoshi and Kim is based on improper hindsight and that “[a] person of ordinary skill in the art would not have attempted and/or understood to modify the internal power supply of Guoshi with the external power supply of Kim.” *Id.* at 45. Patent Owner argues that “a POSITA would not have been motivated to modify Guoshi in view of Kim because Kim explicitly teaches away from mounting a power supply to a plastic casing like Guoshi’s.” *Id.* (citing Ex. 1010, p. 3, ¶ 11; Ex. 2002 ¶ 96).

c) Patent Owner’s Combined Anticipation and Obviousness arguments

For the same reasons as discussed with respect to anticipation, we find that Petitioner has met its burden to show that Guoshi’s display panel does not include a cabinet, and that Guoshi discloses a printed circuit board and plastic casing that is sealed to be waterproof, as these limitations are recited in the base independent claims 1, 13, and 22 for dependent claims 7, 18, 23–

24, and 26–28. Section III.C.2.(d)–(e). We also determine that Petitioner has shown by a preponderance of the evidence that Guoshi discloses “a plastic casing” as required by independent claims 1, 13, and 22, and a control circuit 22 “attached to the [opposite back side of] printed circuit board” as required by independent claims 1, and 22. Section III.C.2.(f)–(g). As determined above, we are persuaded that Petitioner has established by a preponderance of the evidence that claims 1, 2, 9, 13, and 20 are anticipated by Guoshi. Because anticipation is the epitome of obviousness, a disclosure that anticipates under 35 U.S.C. § 102 also renders the claim unpatentable under 35 U.S.C. § 103. *See In re Fracalossi*, 681 F.2d 792, 794 (CCPA 1982); *In re Meyer*, 599 F.2d 1026, 1031 (CCPA 1979); *In re Pearson*, 494 F.2d 1399, 1402 (CCPA 1974).

Patent Owner does not specifically address or refute Petitioner’s obviousness evidence and arguments as to the additional limitations provided in claims 7, 18, 22–24, and 26–28, which Petitioner argues are disclosed by at least one of Guoshi, Kim, and Panagotacos. We are persuaded by Petitioner’s arguments and evidence that these additional limitations recited in claims 7, 18, 22–24, and 26–28 are, in fact, disclosed in either or both of Kim and Panagotacos. Pet. 37–67.

The only question remaining is whether Petitioner has shown that a person of ordinary skill in the art would have combined these references to achieve the claimed invention, thus rendering the challenged claims in this second ground obvious.

*d) Whether Petitioner has Shown Sufficient
Motivation to Combine Guoshi, Kim, and Panagotacos*

Patent Owner argues that Petitioner’s combination of Guoshi, Kim and Panagotacos is the product of improper hindsight and that Petitioner has

not shown that a person of ordinary skill in the art would have combined these references to arrive at a “power supply” arranged externally on the LED display module in the manner as recited in claims 1 and 22. PO Resp. 45. Specifically, Patent Owner argues that a person of ordinary skill in the art “would not have been motivated to modify Guoshi in view of Kim because Kim explicitly teaches away from mounting a power supply to a plastic casing like Guoshi’s.”⁹ *Id.* According to Patent Owner, Kim describes the difficulty with mounting a power supply to a plastic material stating that “since the frame 121 of the LED module 120 is constituted of a plastic material, it is difficult to mount the power supply to the LED module.” *Id.* at 45–46 (quoting Ex. 1010, 3 ¶ 11).

Petitioner contends that a person of ordinary skill in the art would have combined Kim’s teaching of an external power supply module, rather than an internal power supply module because “moving all power supply externally obviates the need for the relatively large ‘receiving holes (120).’” Pet. 43 (citing Ex. 1008 ¶ 30, Fig. 5; Ex. 1005 ¶ 180). Petitioner argues that Kim teaches eliminating larger receiving holes in the base to improve dust and moisture resistance. *Id.* at 23 (citing Ex. 1010, p. 3 ¶ 9). Petitioner argues also that Kim teaches moving the power supply entirely outside of Guoshi’s base 10, thus allowing the base to be made thinner. *Id.* at 45 (citing Ex. 1010, 4 ¶¶ 5–6 and 8, Figs. 4a–4c and 5; Ex. 1005 ¶ 187). Petitioner asserts further, that “in addition to the explicit benefits taught by Kim, a POSITA would have understood that a power supply system placed

⁹ We note that Patent Owner’s argument here appears consistent with Guoshi’s main body 12, i.e., housing 10, being plastic.

outside of the base would be easier to repair or replace.” *Id.* at 46 (citing Ex. 1005 ¶ 189).

We disagree, on the facts in this case, that Kim’s discussion of a prior art “plastic frame 121” teaches away from the combination of Guoshi and Kim. It is true that criticizing or discouraging investigation into mounting a power supply on a plastic structure could entail a teaching away. *See In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004) (prior art does not teach away from claimed subject matter merely by disclosing a different solution to a similar problem unless the prior art also criticizes, discredits, or otherwise discourages the solution claimed). But when considering a teaching away argument “the nature of the teaching is highly relevant.” *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994). On the facts before us in this proceeding, Kim describes and illustrates in Figures 1–3c a conventional LED display board comprised of multiple display modules 120. Ex. 1010, 3 ¶¶ 2–5. Kim further describes a large single multi-panel power supply 113 providing power to all 12 of the LED display modules 120 shown in Figure 2b–c. *See id.* at 3 ¶ 4 (Kim describing “a power supply 113 mounted inside the case [frame] 112 for supplying current to the LED modules 120”). Kim’s Figures 2a–b are reproduced below.

Figure 2a

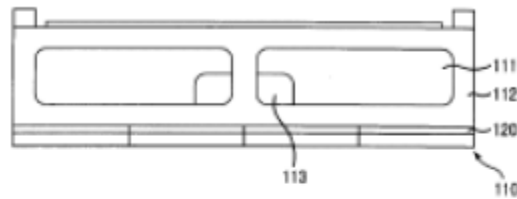
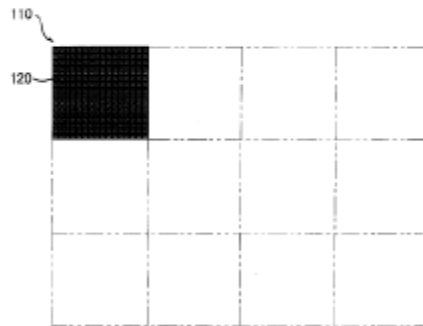


Figure 2b



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Figures 2a–b from Guoshi, above, illustrate a prior art LED display board including multiple display modules 120 powered by single power supply 113.

Kim’s solution includes installing smaller capacity power supplies on the back of each display module, rather than one larger capacity power supply 113. Kim explains that “since a small-capacity power supply 520 is equipped at the rear of each LED module 500, the width of the internal space of the case 601 can be reduced, and the thickness of the LED electronic display board can be reduced.” *Id.* at 5 ¶ 1. Thus, although Kim may teach away from using a larger capacity single power supply in conjunction with a plastic material, Kim expressly solves this problem, at least in part, by teaching the use of a small capacity power supply for each display module.

Id. Mr. Flasck provides testimony that using smaller capacity power supplies “alleviates any concern regarding attaching a power supply according to the Guoshi, Kim, and ordinary skill combination to a plastic base.” Ex. 1005 ¶ 211. Mr. Flasck testifies further that by using such compact power supplies, large, heavy heat sinks are not necessary and that “Panagotacos describes that power supply circuitry can be enclosed in a Faraday cage that has metallic surfaces that are similar in structure to Kim’s heat sink 514 and can dissipate heat, as well.” *Id.* ¶ 216 (citing Ex. 1011, 9:21–23). Considering the teachings of Kim as a whole, we find that the improvements and teachings of Kim, along with Mr. Flasck’s testimony, outweigh any teaching away in Kim’s background discussion relating to a single larger capacity power supply and a plastic frame.

In support of combining Guoshi, Kim, and Panagotacos, Petitioner argues that a person of ordinary skill in the art would have considered placing Guoshi’s power supply externally as taught by Kim because “moving all power supply externally obviates the need for the relatively large ‘receiving holes (120).’” Pet. 43 (citing Ex. 1008, ¶ 30, Fig. 5; Ex. 1005 ¶ 180). Kim explains that any opening in “the rear portion of the LED module” can allow in “dust and moisture introduced from the outside.” Ex. 1010, 3 ¶ 9. Mr. Flasck testifies also that a person of ordinary skill in the art “would have been motivated to use Kim’s external power supply configuration to reduce LED panel thickness and weight.” Ex. 1005 ¶ 186; *see also id.* ¶ 188 (Mr. Flasck explaining that by “moving all power supply circuitry off the PCB, Guoshi’s base could be made thinner because no space would be needed to accommodate power supply circuitry within the base.”). Further, Mr. Flasck testifies that with an external power supply “the entire power supply unit can be easily swapped in and out without having to worry

about circuitry soldered to the circuit board or having to reseal the receiving holes.” *Id.* ¶ 189.

Petitioner admits that Guoshi and Kim do not disclose the details of the power supply circuitry, for example, “an alternating current/direct current (AC/DC) converter,” as recited in claim 7. Pet. 47 (citing Ex. 1005 ¶ 194). Petitioner asserts that such LED power converters were well known in the art, and that “the circuitry components that a POSITA would have desired and known to include in a power supply is described by Panagotacos.” *Id.* Mr. Flasck provides essentially unrebutted support for this position, testifying that “[i]n nearly all commercial and residential applications, modular LED panels receive power from electrical ports outputting AC line voltage,” and that a person of ordinary skill in the art “would have been motivated to include an AC/DC converter as Panagotacos describes because it accommodates different input voltages regardless of the types, numbers, and series or parallel arrangements of LEDs.” Ex. 1005 ¶¶ 196, 198 (citing Ex. 1011, Abstract, 4:2–5).

Patent Owner makes several other argument relating to motivation to combine including the assertion that “waterproofing the power module on the outside of the casing is beyond the level of skill of a person of ordinary skill in the art.” PO Resp. 49. Mr. Credelle testifies that an “external power supply would also require connections to a power source and connections to the display module’s internal circuitry. Neither Guoshi nor Kim discloses how these connections could be made waterproof.” Ex. 2002 ¶ 100. Mr. Credelle attests that waterproofing an external power supply was unknown to those of ordinary skill in the art “as evidenced by the fact the industry mainly used cabinet-enclosed displays, and displays with external power supplies commonly failed due to water ingress.” *Id.*

Petitioner counters, arguing that it was well known in the art that a cable can be “passed through small holes that can be easily sealed using sealing strips or silicone.” Reply 23 (emphasis omitted). Petitioner provides evidence from two prior art references showing that waterproofing electrical component through-holes, at least to the IP 65 and 67 rating, was well known at the time of the filing of the application that became the ’294 patent. *Id.* (citing Exs. 1026, 1029). Also, Petitioner provides evidence that a person of ordinary skill in the art would have known that externally mounted power supplies in waterproof casings were available that used free air convection cooling. *Id.* at 24 (citing Ex. 1031, 3, 6). According to Petitioner’s evidence, based in part on a search of the Internet Archive, the Meanwell Direct company advertised, well-prior to the filing of the ’294 application, waterproof power supplies for LED lighting, stating that “[t]he IP ratings of some of these [LED] power supplies lend themselves for use in other applications where ingress of dust or moisture is a concern with protection levels making them splashproof & waterproof.” Ex. 1031, 1. This evidence supports Mr. Flasck’s testimony that, “waterproofing the display when it is installed outdoors, such as at a sports stadium or in the Times Square, was also well-known prior to 2013.” Ex. 1005 ¶ 48.

We credit Mr. Flasck’s testimony because it is supported by evidence that waterproof LED power supplies and through-holes for accepting power cable into housings, existed and were offered for sale prior to the ’294 patent that had waterproofing capability at various IP levels. Exs. 1026, 1029, 1031. Indeed, Mr. Credelle’s testimony appears to concede, at some level, that waterproofing an external power supply was in fact known to those of ordinary skill in the art, when he explains that “displays with external power supplies commonly failed due to water ingress.” Ex. 2002 ¶ 100.

Patent Owner argues further that “Guoshi cannot be modified to use the configuration in Kim because the power supply would overheat.” *Id.* at 49 (citing Ex. 2002 ¶ 102). Mr. Credelle testifies that “[m]odifying Guoshi to move the power supply to the outer surface of the casing removes the cooling effects the power supply receives from the cooling units.” Ex. 2002 ¶ 103. Although the effects of Guoshi’s cooling elements 24 may no longer be able to cool the power supply within the base, Patent Owner’s argument does not account for the teachings of Kim and Panagotacos which describe, more specifically in Panagotacos, an LED power supply that does not need a large or expansive heat sink. Pet. 50 (citing Ex. 1005 ¶ 202; Ex. 1011, 9:1–4). Panagotacos states that for its circuit design

the amount of power dissipated thermally by the power supply 10 is less than conventional LED power supplies, providing numerous advantages over prior art designs. Since a small amount of energy is transformed into thermal energy and radiated away from the power supply, most of the energy coupled into the power supply 10 is efficiently transferred to the LEDs 14 as electrical power.

Ex. 1011, 7:29–33. Besides noting Panagotacos’ teaching of smaller, thermally efficient power supplies in the Petition, (Pet. 50), Petitioner argues that a person of ordinary skill in the art “would have been motivated to mount the power supply on the outer surface of the base to allow for the power supply to be exposed to the atmosphere and be cooled by the natural air flow.” Reply 24 (citing Ex. 1031, 3); *see also* Ex. 1031, 3 (Meanwell Direct webpage describing various power supply models with “[c]ooling by free air convection”). And, as Mr. Flasck testifies in his declaration, “Panagotacos describes that power supply circuitry can be enclosed in a Faraday cage that has metallic surfaces that are similar in structure to Kim’s heat sink 514 and can dissipate heat, as well.” Ex. 1005 ¶ 216. We find Mr.

Flasck's testimony and Petitioner's arguments and evidence persuasive that a person of ordinary skill in the art would have known to provide appropriately sized power supplies outside the LED case as taught by Kim, that could be air-cooled and also provided with a Faraday cage, as taught by Panagotacos, to eliminate electromagnetic effects and facilitate cooling of the power supply. *Id.*

Patent Owner also takes issue with Petitioner's assertion that locating the power supply on the rear of the LED case facilitates removal and replacement of the power supply. PO Resp. 52. Patent Owner argues that accessing or repairing Guoshi's power supply was easily done because "removal of the waterproof covers only requires unscrewing six screws, which gives access to [the] power supply that can be easily swapped out or repaired." *Id.* This argument, however, ignores the fact that Guoshi discloses power supply 22 mounted on the back side of the circuit board as we determined previously. *See* Section III.B.4.f. Although connection pins of Guoshi's power supply 22 protrude through receiving hole 120, as shown in Guoshi's Figure 7, neither Patent Owner nor Mr. Credelle has explained persuasively how the entire power supply 22 could be accessed or removed from the circuit board via receiving hole 120. *See* Ex. 2002 ¶ 106 (Mr. Credelle mainly testifying that "the power module of Guoshi is easily accessed for repairs"). Even if receiving hole 120 was large enough to access and remove power supply 22 from the Guoshi's circuit board, this does not negate that a person of ordinary skill in the art would find a power supply mounted on the outer exposed side of housing 112 easy to access and replace.

Finally, Patent Owner argues that Petitioner has not explained how the power supply would be mounted to the exposed outer side of Guoshi's

plastic case. PO Resp. 54. Again relying on Kim and the purported difficulty of mounting a power supply to a plastic case, Mr. Credelle testifies that “[a] person of ordinary skill in the art would understand that mounting the power supply to Guoshi’s plastic base would be problematic and inadequate.” Ex. 2002 ¶ 110. Petitioner responds arguing that “[t]he use of screws or nuts to affix an external power supply to a plastic base was widely known prior to 2013. Kim explicitly discloses an externally mounted power supply, undermining any allegation that the combination is based solely on the claimed invention.” Reply 25. Mr. Flasck testifies that by moving the power supply from the circuit board to a location external to the case, and “the power supply optionally enclosed within a Faraday cage (as discussed below) would simply be attached to the back of Guoshi’s base.” Ex. 1005 ¶ 219. Neither Mr. Flasck nor Mr. Credelle provide particularly detailed or persuasive support for their testimony.

What we see in the evidence of record, initially, is Kim’s teaching that a single large power supply presents attachment problems with a plastic material. Ex. 1010, 3 ¶ 11. Yet, Kim further describes that as an improvement, “a small-capacity power supply can be installed for each LED module, so that the thickness of the case of the LED sector can be reduced.” Ex. 1010, 3 11. Kim also describes that “[a] power supply 520 for supplying a DC current is equipped on an outer wall of the heat sink 514; the power supply 520 may be integrally formed with the heat sink 514 or may be detachable.” *Id.* at 4. We acknowledge that Kim does not explain, specifically, how the small capacity power supply is attached or detachable. Mr. Flasck testifies that for a person of ordinary skill in the art the combination of Guoshi, Kim, and Panagotacos, “would have been nothing more than a *simple substitution of one known element* (a power supply with

partially integrated circuitry within a panel base) *for another* (a power supply outside the base) *to obtain predictable results.*” Ex. 1005 ¶ 191 (emphasis in original). Mr. Flasck testifies persuasively that “this combination would have been *the use of a known technique* (using a specific LED power supply with stable current output) *to improve a similar device* (a generic power supply disclosed in Kim), where the LED panel would function *in the same way* as before.” *Id.* ¶ 205 (emphasis in original).

We determined that a person of ordinary skill in the art includes a person with at least an undergraduate degree in mechanical engineering, electrical engineering, or physics and, in addition, at least two years of experience in the design and/or implementation of LED panels. *See* Section I.G. Based on this level of skill and experience, the teachings in the prior art and Mr. Flasck’s testimony, we are persuaded that physical attachment of a power supply to a plastic substrate such as the back of an LED panel case could have likely been accomplished with known methods and components, for example screws similar to those discussed in Guoshi for securing the water proof covering to the case and would have been within the level of ordinary skill in the art in this case. *See, e.g.*, Ex. 1008, 3 (Guoshi explaining that “tightening screws are used to firmly install the waterproof covers (50) and sealing strips (40) on the base (10).”). Considering the evidence discussed above, and given that “a person of ordinary skill in the art has good reason to pursue the known options within his or her technical grasp” we are persuaded that attaching a power supply to the outside of a plastic case would have been well within the level of ordinary skill in the art. *See KSR*, 550 U.S. at 421.

e) Conclusion as to Obviousness of Claims 7, 18, 22–24 and 26–28

Having considered all the evidence of record presented by both parties, we find persuasive Petitioner’s arguments and evidence, including the testimony of Mr. Flasck, and determine that Petitioner has shown by a preponderance of the evidence that claims 7, 18, 22–24 and 26–28 would have been obvious to a person of ordinary skill in the art based on the combination of Guoshi, Kim and Panagotacos.

E. Obviousness of Claim 30 over Guoshi, Kim, and Nicholson (Ground 3)

For the reasons set forth below, we determine that Petitioner has shown by a preponderance of the evidence that claim 30 would have been obvious in view of Guoshi, Kim, and Nicholson.

1. Nicholson (Ex. 1012)

Nicholson is titled “Enhanced Modular Message Board” and describes “a modular electronic sign having a plurality of display units assembled on a mounting track and connected to a sign controller.” Ex. 1012, Abstract. Sign controller 18 is shown, below, in Figure 2 of Nicholson.

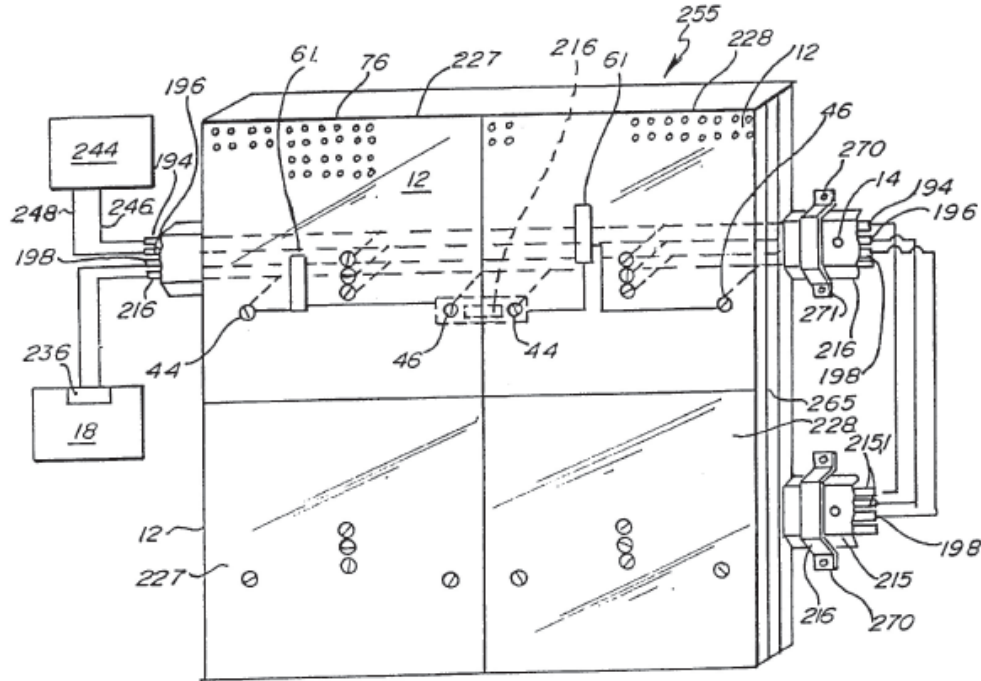


Fig. 2.

Figure 2 of Nicholson, above, illustrates sign controller 18 and information output 236 connected to first and second display units 227, 228. Nicholson explains that sign controller 18 “compris[es] a memory 232, an information input 234 and a plurality of information outputs 236 such as serial communication ports, and a processor 240.” *Id.* at 5:20–22. In one embodiment, sign controller 18 communicates in series with each display unit providing each display unit a certain portion of the information to be displayed on the sign. *Id.* at 5:27–32.

2. Claim 30

Claim 30 depends directly from independent claim 22 and recites the additional limitations of “a receiver card configured to receive external data and provide the external data to the circuit for controlling the plurality of LEDs, the receiver card comprising a unique network address.” The ’294 patent explains that “a large multi-panel display modular system 1300 may

include multiple data receiver boxes 1400 for displaying portions of the multi-panel modular display system 1300.” Ex. 1001, 28:57–60. The ’294 patent describes that each receiver box 1400 “include[s] a designated IP address and therefore receives the output of the controller 1800 that is specifically sent to it.” *Id.* at 29:1–2.

Petitioner argues that although Guoshi does not describe how the individual display modules receive and display respective image portions on different modules in a multi-module display, “Nicolson discloses a multi-unit display, where each unit[] includes components for receiving and displaying its respective portion of an image, and techniques for operating such a display.” Pet. 67 (citing Ex. 1005 ¶ 293). According to Petitioner, Nicholson teaches “display unit circuitry that includes memory to store portion of the information to be displayed on the particular display unit, an addressing portion, a signal receiver portion, and a message output portion.” *Id.* at 68 (citing Ex. 1012, 9:49–59, Fig. 6).

Petitioner also argues that a person of ordinary skill in the art “would have understood that because Nicholson’s technique employs the ‘multi-drop scheme’ which was a well-known, standardized scheme by 2013, the components needed to assemble and maintain Nicholson’s circuitry would have been readily available and been relatively inexpensive.” *Id.* at 70 (citing Ex. 1005 ¶¶ 300–302). As evidence for such reasoning, Petitioner asserts that “Guoshi, Kim, and Nicholson all describe multi-module outdoor LED displays, and also because the improvements to the modules that Nicholson describes could be implemented readily by adding or replacing a few, simple, standardized electronic components.” *Id.* (citing Ex. 1005 ¶ 303).

Patent Owner does not expressly address Petitioner’s challenge to claim 30 and Nicholson. We are persuaded by Petitioner’s arguments and evidence that these additional limitations of a “receiver card” and a “unique network address” recited in claim 30 are taught by the combination of Guoshi, Kim, and Nicholson. Pet. 67–69. We are also persuaded that Petitioner has presented articulated reasoning and evidentiary underpinnings explaining persuasively why a person of ordinary skill in the art would have been motivated to combine Nicholson’s sign controller 18 and “multi-drop scheme” including display module addresses, with Guoshi and Kim to meet the limitations of claim 30. *Id.* at 69–70.

Having considered all the evidence of record presented by both parties, we find persuasive Petitioner’s arguments and evidence, including the testimony of Mr. Flasck, and determine that Petitioner has shown by a preponderance of the evidence that claim 30 would have been obvious to a person of ordinary skill in the art based on the combination of Guoshi, Kim, and Nicholson.

F. Patent Owner’s Motion to Dismiss Exhibits 1025, 1026, 1029, 1030, 1031, and 1032

Patent Owner entered a Motion to Dismiss Petitioner’s Exhibits 1025, 1026, 1029, 1030, 1031, and 1032. Mot. 1. This Decision substantively references only Exhibits 1026, 1029, and 1031 as Exhibits 1026 and 1029 are translations of the documents filed as Exhibits 1025 and 1032 and our Decision does not rely on Exhibit 1030. Therefore, Patent Owner’s Motion to Dismiss Exhibits 1025, 1030, and 1032 is moot. We address Exhibits 1026, 1029, and 1031 below.

1. Exhibits 1026 and 1029

Exhibit 1026 is a machine translation of Chinese Patent Application Publication No. CN 102727646 A (Exhibit 1025). Exhibit 1029 is a machine translation of German Patent Application Publication No. DE 20 2010 005 210 U1 (Exhibit 1032). Patent Owner argues that these machine translations, relied upon by Petitioner as evidence of known electronic component sealing and waterproofing techniques, are irrelevant and prejudicial under Federal Rules of Evidence 402 and 403 because they are “defective translations” and “incomprehensible,” and not from the field of LED displays. Mot. 3–4. Patent Owner also argues that these exhibits are unsupported by expert testimony. *Id.* at 4.

In its Reply, Petitioner relies on Exhibits 1026 and 1029 and the respective patent application disclosures as evidence that a person of ordinary skill in the art understood that passing a power cable from an externally mounted power supply through a small hole in a housing “can be easily sealed using sealing strips or silicone. Such configurations were well-known and commonly practiced in the electronic industry.” Reply 15 (citing Ex. 1026; Ex 1029). Petitioner also points to Exhibits 1040 and 1042 that are translator declarations attesting to the accuracy of the translations and argues that while parts of the translations may be “grammatically incorrect, [this] does not render the entire document ‘incomprehensible.’” Opp. Mot. 4. Petitioner offers this evidence in response to Patent Owner’s argument that mounting an external power supply “would only complicate the design by requiring new connections and attachments in the base, which would provide additional entry points for water.” PO Resp. 52 (citing Ex. 2002 at ¶ 97). This evidence is relevant also, Petitioner argues, because

Patent Owner asserts that both Mr. Flasck and “Petitioners fail to explain how the power supply would be made waterproof.” *Id.*

We do not find these reference translations to be so incomprehensible as to be irrelevant or prejudicial. To be sure, the grammar and syntax of the machine translations makes for awkward reading. But the translations describe sufficient structure and functional characteristics of the electric cable “sealing device and distribution box” in Exhibit 1026, as well as the photovoltaic module “electrical junction box” described in Exhibit 1029, so as to be generally understandable. *See, e.g.*, Ex 1026, Abstract (The Abstract describing “[a]n electric cable incoming line sealing device includes a structural main body, a sealing piece sleeved on the electric cable incoming line in a hooping manner, and a mounting piece used for mounting the structural main body on a distribution box”).

The references in Exhibits 1026 and 1029 are also relevant in response to Patent Owner’s charge that a person of ordinary skill in the art would not have been motivated to mount a power supply on the back of the display module case, because it would require additional holes and because “Petitioners fail to explain how the power supply would be made waterproof.” PO Resp. 52 (citing Ex. 2002 at ¶ 97). Both exhibits pre-date the priority date of the challenged patent and are directed to electronic devices which require some level of water ingress protection and discuss in some detail that electric junction boxes and component through holes were known to be adequately sealed to certain levels of ingress protection, such as IP65. *See* Ex. 1026, 5 (explaining that “the distribution box of sealing configuration of the present invention is installed can reach more than the IP65.”); *see also* Ex. 1029, 2 (reference stating that “[t]he housing is adhered watertight to the back of the photovoltaic module. The electrical connection

box complies with the degree of protection IP 65, protection class II, up to 800 (1000) V DC, test voltage 3.5 KV DC, which corresponds to a general requirement for such junction boxes”). To the extent the references of Exhibits 1026 and 1029 need expert support, Petitioner’s declarant, Mr. Flasck, originally provided testimony with the Petition as to the level of skill in the art, testifying that “waterproofing the display when it is installed outdoors, such as at a sports stadium or in the Times Square, was also well-known prior to 2013.” Ex. 1005 ¶ 48. And, responsive to Patent Owner’s arguments to the contrary, Exhibits 1026 and 1029 simply provide specific examples and evidence of *how* this was known to be done, albeit for different, but similar outdoor and weather-exposed electronic devices and components. We are not persuaded that these exhibits supporting Petitioner and Mr. Flasck’s assertions as to the level and knowledge of ordinary skill in the art are unsupported, prejudicial or unfair, particularly where Patent Owner has challenged the knowledge, background and the level of ordinary skill in the art as to waterproofing electrical components. Finally, Exhibits 1026 and 1029 are not submitted or applied as prior art *per se*, but are submitted for the limited purpose of showing the background knowledge of a person of ordinary skill in the art at the time of the invention. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362 (Fed. Cir. 2013)(The Federal Circuit determining that “the Board failed to account for critical background information that could easily explain why an ordinarily skilled artisan would have been motivated to combine or modify the cited references to arrive at the claimed inventions”); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1365 (Fed. Cir. 2015)(The Federal Circuit explaining that “[a]rt can legitimately serve to document the knowledge that skilled artisans would bring to bear in reading the prior art identified as producing obviousness”).

Therefore, we DENY Patent Owner's Motion to Exclude Exhibits 1026 and 1029.

2. *Exhibit 1031*

Patent Owner argues that Exhibit 1031, a document relied upon by Petitioner as evidence that waterproof LED power supplies were well-known and commercially available, is irrelevant and prejudicial under FRE 401–403. Mot. 6. Exhibit 1031 is allegedly a website capture from a company called, “MeanWell,” by the “Wayback Machine.” Ex. 1031, 1. The Wayback Machine indicates that the MeanWell website was scraped from the Internet on January 16, 2012. Ex. 1031, 1. Patent Owner argues that “[t]here is no evidence in the record (or anywhere) that the Kim reference used a MeanWell power supply or the type of power supply that is identified in Exhibit 1031.” Mot. 6. Patent Owner also argues that the document is irrelevant and prejudicial because Petitioner is using the document to show a person of ordinary skill in the art would have mounted a power supply externally, without citation to any support or evidence. *Id.* at 7.

Petitioner does not assert, however, that Kim actually uses a MeanWell power supply. Reply 26–27. Petitioner relies on the MeanWell website to show that a person of ordinary skill in the art “would have known that externally mounted power supplies, *such as* Kim’s power supply 520, were commercially available in waterproof casings.” *Id.* at 26 (emphasis added). We do not understand the Reply as arguing that Kim specifically uses a MeanWell LED power supply, only that commensurate power supplies *such as* disclosed by Kim were commercially available and known to those of ordinary skill in the art. *Id.* With respect to support for Exhibit 1031, this document was responsive to Patent Owner’s arguments, and, as discussed above with respect to Exhibits 1026 and 1029, Mr. Flask testified

that “waterproofing the display when it is installed outdoors, such as at a sports stadium or in the Times Square, was also well-known prior to 2013.” Ex. 1005 ¶ 48. The MeanWell website in Exhibit 1031 buttresses this testimony, offered in response to Patent Owner’s assertion that neither Mr. Flasck nor Petitioner explained how such waterproofing of the power supply would have been accomplished. We find Petitioner’s arguments and evidence, as a whole, offer sufficient support for the assertion that waterproofing of LED power supplies was known and readily available in the industry to those of ordinary skill in the art. Finally, the MeanWell website is not prior art *per se*, but is submitted for the limited purpose of showing the background knowledge of a person of ordinary skill in the art at the time of the invention. *See Randall Mfg.* 733 F.3d at 1362; *Ariosa Diagnostics*, 805 F.3d at 1365.

Finally, Patent Owner “also objects to Exhibit 1031 under FRE 801–804 as hearsay, arguing that it “is a statement made outside of this proceeding and relied upon by Petitioners to prove the truth of the matter asserted in Exhibit 1031.” Mot. 3. Exhibit 1031 is not offered to prove the truth of the matter asserted in the MeanWell website, e.g., that MeanWell’s power supply products were waterproof, rather for the fact that the contents, specifically waterproof LED power supplies, were known and commercially available to those of ordinary skill in the art. *See, e.g., Joy Techs., Inc. v. Manbeck*, 751 F. Supp. 225, 233 n.2 (D.D.C. 1990), *judgment aff’d*, 959 F.2d 226 (Fed. Cir. 1992) (“A prior art document submitted as a “printed publication” . . . is offered simply as evidence of what it describes, not for proving the truth of the matters addressed in the document. Therefore, it is not hearsay under Fed.R.Evid. 801(c).”).

To the extent that Exhibit 1031 could be considered hearsay, it is also the type of information that falls under FRE 703 as the bases that an expert would reasonably rely upon to form and substantiate an opinion. We determine that Exhibit 1031, as it provides details of commercially available waterproof power supplies for electronic applications, is the type of information that has probative value in evaluating Mr. Flasck's testimony. Thus, whether the exhibit is admissible or not, the information is helpful in evaluating Mr. Flasck's testimony as to the level, skill, and knowledge of those of ordinary skill in the art and substantially outweighs any prejudicial effect to Patent Owner.

Accordingly, we DENY Patent Owner's Motion to Exclude Exhibit 1031.

IV. CONCLUSION¹⁰

For the foregoing reasons, we determine Petitioner has demonstrated by a preponderance of the evidence that claims 1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, and 30 of the '294 patent are unpatentable.

V. ORDER

Accordingly, it is

¹⁰ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

ORDERED that claims 1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, and 30 of U.S. Patent No. 9,978,294 B1 are held unpatentable under 35 U.S.C. § 103 as obvious;

FURTHER ORDERED that, because this is a Final Written Decision, parties to the proceeding seeking judicial review of this decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 2, 9, 13, 20	102	Guoshi	1, 2, 9, 13, 20	
7, 18, 22–24, 26–28	103(a)	Guoshi, Kim, Panagotacos	7, 18, 22–24, 26–28	
30	103(a)	Guoshi, Kim, Nicholson	30	
Overall Outcome			1, 2, 7, 9, 13, 18, 20, 22–24, 26–28, 30	

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