Trials@uspto.gov
571-272-7822

Paper 41
Date: January 19, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

POWER2B, INC.,
Patent Owner.

IPR2021-01239
Patent 8,624,850 B2

Before BARBARA A. PARVIS, SHEILA F. McSHANE, and JOHN D. HAMANN, *Administrative Patent Judges.*

HAMANN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Denying Patent Owner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner") challenge the patentability of claims 15–18, 21, 22, 26, 30, 31, and 41 ("the challenged claims") of U.S. Patent No. 8,624,850 B2 (Ex. 1001, "the '850 patent"), owned by Power2B, Inc. ("Patent Owner"). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) (2018) and 37 C.F.R. § 42.73 (2022).

For the reasons discussed herein, we determine that Petitioner by a preponderance of the evidence (i) shows that claims 31 and 41 are unpatentable, and (ii) does not show that claims 15–18, 21, 22, 26, and 30 are unpatentable.

A. Procedural History

Petitioner filed a Petition requesting *inter partes* review of the challenged claims of the '850 patent. Paper 1 ("Pet."). Patent Owner filed a Preliminary Response. Paper 8. With our authorization, Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 10) relating to claim construction and discretionary denial under § 325(d), and Patent Owner filed a Preliminary Sur-reply in response to the Preliminary Reply (Paper 11).

We instituted *inter partes* review of all of the challenged claims of the '850 patent on all of the grounds raised in the Petition. Paper 12 ("Dec. on Inst."), 45. Patent Owner filed a Response to the Petition. Paper 17 ("PO Resp."). Petitioner filed a Reply to Patent Owner's Response. Paper 21 ("Pet. Reply"). Patent Owner filed a Sur-reply to Petitioner's Reply. Paper 26 ("PO Sur-reply").

Patent Owner filed a Motion to Exclude certain of Petitioner's evidence (Paper 28, "Mot." or "Motion") and Petitioner filed an Opposition (Paper 34, "Opp.").

An oral hearing was held on October 14, 2022. A transcript of the oral hearing is included in the record. Paper 40 ("Tr.).

B. Real Parties-in-Interest

The parties identify themselves as the real parties-in-interest. Pet. 2; Paper 7, 2.

C. Related Matters

The parties identify *Power2B, Inc. v. Samsung Electronics Co.*, Case No. 6:20- cv-01183-ADA (W.D. Tex.) (the "parallel litigation") as a matter that may affect, or be affected by, a decision in this proceeding. Pet. 2; Paper 7, 2. In addition, Petitioner has filed petitions for *inter partes* review of four additional patents that also are owned by Patent Owner: (i) U.S. Patent No. 10,156,931 B2 (IPR2021-01190); (ii) U.S. Patent No. 8,610,675 B2 (IPR2021-01220); (iii) U.S. Patent No. 9,317,170 B2 (IPR2021-01257); and (iv) U.S. Patent No. 9,569,093 B2 (IPR2021-01266).

D. The Challenged Patent

The '850 patent "relates to displays, information input devices[,] and user interface functionalities." Ex. 1001, 1:32–33. More specifically, the '850 patent "seeks to provide an integrated display and input device, [with] improved user interfaces and user interface functionalities." *Id.* at 1:51–53. Figure 23B, shown below, illustrates an embodiment of the '850 patent. *Id.* at 9:1–4.

FIG. 23B

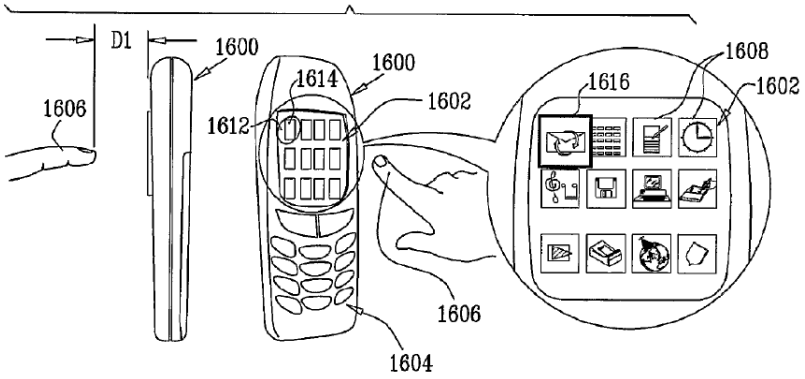

Figure 23B, above, is an "illustration[] of desktop user interface functionality of a mobile device constructed and operative in accordance with a preferred embodiment of the" '850 patent. *Id.* As illustrated, "the integrated display and input device is a mobile computer and/or communicator 1600, . . . and includes a display screen 1602 having touch responsive input functionality and/or propinquity responsive input functionality." *Id.* at 50:10–13. The "display screen 1602 typically displays an array of application launch icons 1608." *Id.* at 50:41–43. In addition, "keyboard 1604 may be provided as part of the integrated display and input device." *Id.* at 50:33–36.

Figure 23B "shows finger 1606 located at a first distance Dl from display screen 1602, such that the propinquity responsive input functionality senses finger 1606 in propinquity to display screen 1602 which defines an impingement area 1612 of light reflected from finger 1606 that is generally centered on a first application launch icon 1614." *Id.* at 50:44–50. The '850 patent discloses that "[t]he functionality of the mobile device 1600 causes icon 1614 to appear in an enlarged or otherwise visually sensibly emphasized form, as indicated by reference numeral 1616." *Id.* at 50:50–53.

To enable propinquity functionality, the '850 patent discloses various embodiments, such as illustrated in Figure 4, shown below. *Id.* at 15:1–5.

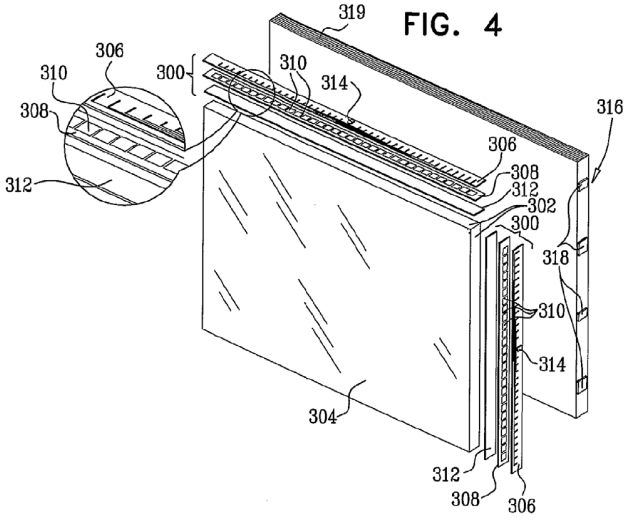

Figure 4, above, "is a simplified illustration of a portion of an input device" "employing detector elements arranged along edges of a display element," in accordance with an embodiment of the '850 patent. *Id.* As illustrated, Figure 4 shows "at least one detector assembly 300 is arranged along at least one edge 302 of a viewing plane defining plate 304 to sense light impinging on plate 304 and propagating within the plate 304 to the edges 302 thereof." *Id.* at 15:5–9. "Preferably, detector assemblies 300 are provided along at least two mutually perpendicular edges 302, as shown, though detector assemblies 300 may be provided along all or most of edges 302" or "may be provided along only one edge 302 of plate 304." *Id.* at 15:11–16. As illustrated, "the detector assembly 300 comprises a support substrate 306 onto which is mounted a linear arrangement 308 of detector elements 310." *Id.* at 15:17–20. "Interposed between linear arrangement 308 and edge 302 is a cover layer 312," which may provide "physical protection, light intensity limitation, and field-of-view limitation." *Id.* at 15:20–24. The support substrate 306 may be mounted onto a display housing or onto an edge 302 of

plate 304. *Id.* at 15:27–30. "A processor 314 for processing the outputs of the detector elements 310 may also be mounted on the support substrate 306." *Id.* at 15:35–37.

E. The Challenged Claims

Petitioner challenges claims 15–18, 21, 22, 26, 30, 31, and 41 of the '850 patent, of which claims 15 and 31 are independent. Claims 15 and 31 are illustrative, and read as follows:

> 15. An integrated display and input device, comprising:
> a pixel array configured to provide a visually sensible output;
> at least one sensor configured to sense at least a position of at least one object with respect to the pixel array when the at least one object has at least a predetermined degree of propinquity to the pixel array;
> circuitry configured to receive an output from the at least one sensor and to provide a non-imagewise input that is representative of the position of the at least one object relative to the pixel array; and
> wherein the at least one sensor includes a detector assembly arranged at least one edge of a viewing plane defining plate.

Ex. 1001, 66:65–67:11.

> 31. A position sensing assembly comprising:
> a plate defining a surface;
> at least one pixel array including a plurality of detector elements configured to detect electromagnetic radiation at a baseline level, the at least one pixel array being configured to sense a position of an object with respect to the surface according to locations of ones of the plurality of detector elements at which at least one of the amount of radiation detected and the change in the amount of radiation detected exceed a predetermined threshold, the at least one pixel array being configured to sense at least a position of at least one object with respect to the at least one pixel array when the at least one object has at least a

> predetermined degree of propinquity to the at least one pixel array;
>
> circuitry configured to receive an output from the at least one pixel array and to provide a non-imagewise input that is representative of the position of the at least one object relative to the at least one pixel array; and
>
> wherein the change in the amount of radiation detected results from ones of the plurality of detector elements detecting reflected light from the object in addition to detecting the radiation at the baseline level.

Ex. 1001, 68:51–69:6.

F. Instituted Grounds of Unpatentability

We instituted trial based on the following grounds of unpatentability, which are all the grounds of unpatentability raised in the Petition:

Claim(s) Challenged	35 U.S.C. §[1]	Reference(s)/Basis
15–18, 21, 22, 30, 31, 41	103(a)	Reime[2]
31, 41	103(a)	Yamaguchi[3]
15–18, 21, 22, 26, 30, 31, 41	103(a)	Reime, Hinckley[4]
31, 41	103(a)	Yamaguchi, Hinckley

Pet. 3–4, 20–75. Petitioner submits the Declaration of Benjamin B. Bederson (Ex. 1002) and the Reply Declaration of Benjamin B. Bederson (Ex. 1035) in support of its arguments. Patent Owner submits the

[1] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the '850 patent issued from an application filed before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.
[2] US 2003/0034439 A1, published Feb. 20, 2003 (Ex. 1010, "Reime").
[3] US 2005/0219229 A1, published Oct. 6, 2005 (Ex. 1009, "Yamaguchi").
[4] US 2002/0021278 A1, published Feb. 21, 2002 (Ex. 1011, "Hinckley"). Petitioner lists the combination of Reime and Hinckley as a separate asserted ground for claim 26. We combine these two asserted grounds into one as they rely on the same combination.

Declaration of Darran R. Cairns, Ph.D. (Ex. 2056) in support of its arguments.

II. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962–63 (Fed. Cir. 1986)). "[O]ne or more factors may predominate." *Id.*

In our Decision on Institution, we adopted the following definition for one having ordinary skill in the art at the time of the invention of the '850 patent: one who "would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and . . . years of experience in the research, design, development, and/or testing of touch and/or proximity sensors, human-machine interaction and interfaces, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa." Dec. on Inst. 20–21 (quoting Pet. 8–9 (citing Ex. 1002 ¶ 44)). This definition mirrors what Petitioner proposed, except we excised the phrase "at least" which modified the years of experience as that language is vague and open-ended. *Id.*

Patent Owner proposes a different definition for one of ordinary skill in the art, but does not specifically address any deficiencies in Petitioner's

proposed definition. PO Resp. 8–9. Rather, Patent Owner states that Petitioner's obviousness arguments "are not affected [by] differences in the definitions." *Id.* at 9 (citing Ex. 2056 ¶ 10); *see also* Tr. 59:7–16 (providing that Patent Owner's arguments do not turn on what definition we choose).

Because Petitioner's definition of the level of skill in the art (excluding "at least") is consistent with the '850 patent and the asserted prior art, we maintain it for purposes of this Final Written Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). Our analysis herein, however, does not turn on which of the parties' definitions we adopt.

III. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b); 83 Fed. Reg. 51,340, 51,340–41, 51,343 (Oct. 11, 2018). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

The parties dispute how to construe (i) "a predetermined degree of propinquity" and (ii) "a detector assembly." PO Resp. 9–29; Pet. Reply 1–15; PO Sur-reply 1–11. We address these two terms below.

A. Predetermined Degree of Propinquity

Patent Owner argues that we should construe "a predetermined degree of propinquity" to mean "a specified proximity distance established in advance and does not include touching." PO Resp. 9. In contrast, Petitioner argues that this term should be afforded its plain and ordinary meaning, which does not exclude touching. Pet. Reply 2–3. The parties agree, however, that "propinquity" is interchangeable with "proximity." Pet. Reply 3 n.4; PO Sur-reply 3; *see also* Ex. 1034, 2 (district court construing "propinquity" to mean "proximity"). We first address the "does not include touching" portion of Patent Owner's proposed construction, and then address the remaining portion.

1. Does Not Include Touching

Patent Owner argues that "[t]he language in challenged independent claims 15 and 31 does not mention or reference any 'touching.'" PO Resp. 12. Petitioner responds that in the claims "at least" immediately proceeds "a predetermined degree of propinquity," and in that context, "when the object has ***at least*** that degree of proximity or more (i.e., is more proximate, up to and including touching) the pixel array senses the object." Pet. Reply 3; *see also, e.g.*, Ex. 1001, 67:1–4 (reciting "sens[ing] at least a position of at least one object with respect to the pixel array when the at least one object has at least a predetermined degree of propinquity to the pixel array").

Patent Owner argues that the '850 patent Specification supports that "propinquity" does not include touching. PO Resp. 14–16. In particular, Patent Owner argues that the '850 patent Specification repeatedly uses the

term "propinquity" to describe and depict an object positioned at a distance from the device without touching. *Id.* at 14 (citing Ex. 1001, 48:23–25, 48:63–65, 50:46–47, 52:3–6, Figs. 18A, 20A, 21A, 22, 23A, 23B, 23C, 24A, 24B, 25A, 25B, 26A). For example, Patent Owner refers to the Specification's disclosure that "[i]n FIG. 20A, the user's fingers are located in propinquity to plate 1508, at a height H therefrom." *Id.* (quoting Ex. 1001, 48:23–25). "In contrast, the '850 patent [S]pecification uses the word 'touch' to describe an object in contact with the device," according to Patent Owner. *Id.* at 15 (citing Ex. 1001, 48:25–26, 48:65–66, 51:9–13, Figs. 20B, 21B, 23E, 24C, 26B, 26E, 27D, 28A, 29B).

Petitioner argues that the "[S]pecification consistently uses the phrase 'having at least a predetermined degree of propinquity' to cover both when the object is in proximity and when the object is 'touching' the pixel array." Pet. Reply 5. For example, Petitioner refers to the Specification's disclosure that in Figure 22 that "one of the user's fingers is located in propinquity to but not touching plate 1508 and one of the user's fingers is touching plate 1508." *Id.* at 6 (quoting Ex. 1001, 49:31–33).

We agree with Petitioner and conclude that Patent Owner incorrectly attempts to exclude touching from the claims. Patent Owner incorrectly focuses on the term "propinquity" itself and ignores the surrounding claim language. That is, whether propinquity and touching are mutually exclusive, as Patent Owner argues, is inapposite. The claims do not recite having a particular propinquity. Rather, they recite "ha[ving] *at least* a predetermined degree of propinquity," without reciting a lower bound. *E.g.*, Ex. 1001, 67:2–4 (emphasis added). The plain meaning thus includes a degree of propinquity, and being closer.

The Specification supports this conclusion by disclosing detecting a user's fingers when they touch, or are located in propinquity to, a surface. *See, e.g.*, *id.* at 47:28–31 ("[A] position of a user's fingers is detected by means of a touch responsive input functionality and/or propinquity responsive input functionality."), 48:26–29 ("When the user's fingers' touch, as in FIG. 20B, or is located in propinquity to, as in FIG. 20A, plate 1508, the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."), 49:1–4 ("When the user's fingers touches, as in FIG. 21B, or is located in propinquity to, as in FIG. 21A, plate 1508, the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."), 49:33–36 ("When the user's fingers touch, or are located in propinquity to, plate 1508**,** the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."). In other words, the Specification discloses that the fingers are sensed when they have at least the degree of propinquity, or are closer (e.g., touching). *Id.*

Patent Owner's reliance on the Specification to argue that "propinquity" is mutually exclusive from touching is inapposite. PO Resp. 14–16. Again, the claims recite—and the Specification discloses—sensing an object having "at least" a degree of propinquity. Ex. 1001, 67:2–4.

In addition, we find unavailing Patent Owner's reliance on certain dependent claims to support its arguments. *See* PO Resp. 13–14; PO Sur-reply 3–4. In particular, Patent Owner argues that dependent claims 7, 10, 34, and 37 demonstrate that the '850 patent "uses different language to describe when an object 'touches' or is 'touching' the device." PO Resp. 13. This argument is unavailing for the same reasons discussed above. Again, whether propinquity is mutually exclusive from touching is inapposite in the context of the claims.

Rather, we find that these dependent claims support our conclusion that having at least a predetermined degree of propinquity does not exclude touching. *See* Ex. 1001, 66:18–21, 66:32–35, 69:16–19, 69:31–34. For example, dependent claim 34 adds that "utilization circuitry is further configured to distinguish at least between positions of the at least one object when touching and not touching the device." *Id.* at 69:16–19. We find persuasive Petitioner's following argument, which concisely expresses the logical impact of dependent claim 34 on the proposed construction:

> Claim 31 requires a pixel array sensing an object within a predetermined degree of propinquity to the pixel array, while claim 34 requires circuitry sensing a distinction between when the same object touches or does not touch the device. For claim 34's circuitry to be able to sense a distinction between instances of touching and not touching, claim 31's pixel array cannot exclude the instance of touching without rendering claim 34 a nullity.

Pet. Reply 4 (citation omitted). In other words, if sensing a position of an object when the object "has at least a predetermined degree of propinquity to the at least one pixel array" excludes when the object touches the array, there is no "object when touching" position later to distinguish. *Compare* Ex. 1001, 68:55–65, *with id.* at 69:16–19.

Moreover, we find unavailing Patent Owner's arguments that there is no nullity concern because claims 31 and 34 recite different structures and operations that do not reference or exclude each other. PO Sur-reply 4. In particular, Patent Owner argues that the dependent "claims require additional utilization circuitry—not the pixel array—to sense touching." *Id.* Contrary to Patent Owner's arguments, claim 34's utilization circuitry is further configured "to distinguish" between positions, rather than to sense touching. Ex. 1001, 69:16–19. Notably, intervening claim 33, which

depends from claim 31, and from which claim 34 directly depends, recites that claim 31's circuitry is "configured to receive an output from the at least one sensor [and] is coupled and configured to provide the non-imagewise input to the utilization circuitry." *Id.* at 69:10–15. In other words, the utilization circuitry is told about the sensed position of the object. *See id.* at 68:51–69:6, 69:10–19. Nor do we find availing Patent Owner's arguments concerning claim differentiation. PO Resp. 21–22; PO Sur-reply 3–4. For the reasons we discuss above, we conclude that the dependent claims add limitations (e.g., utilization circuitry to distinguish between positions) to further narrow claim scope rather than to introduce touching, as Patent Owner argues.

In addition, we have reviewed the testimony of the parties' experts that Patent Owner cites, but we give it little, if any, weight in light of the clear disclosure of the intrinsic evidence. *See Wi-LAN, Inc. v. Apple Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016) (finding extrinsic evidence "is generally of less significance than the intrinsic record" in matters of claim construction); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (finding that when "an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term[,] . . . it is improper to rely on extrinsic evidence").

Lastly, our conclusion to not include "and does not include touching" is consistent with the plain and ordinary meaning of the claim language in light of the intrinsic evidence. As such, our conclusion also is consistent with the district court's construction (i.e., "[p]ropinquity means 'proximity,' and plain and ordinary meaning for the remaining language"). Ex. 1034, 2.

In sum, we conclude that the construction for this term should not include Patent Owner's proposed "and does not include touching."

2. Specified Proximity Distance Established in Advance

Patent Owner's proposed construction replaces "a predetermined degree of propinquity" with "a specified proximity distance established in advance." PO Resp. 16–17. Petitioner argues that this term should be afforded its plain and ordinary meaning. Pet. Reply 2–3.

Patent Owner argues that "the '850 patent [S]pecification makes clear the 'predetermined degree' language requires a specified distance established in advance." PO Resp. 16. Patent Owner adds that the '850 patent discloses "performing certain operations based on an object being at pre-established and specific distances." *Id.* (citing Ex. 1001, 49:44–51:3, 52:3–15, 55:29–44). For example, the '850 patent discloses performing one action "when a finger is sensed at a first specific distance D1 from a screen, and a second action . . . when the finger is sensed at a second specific distance D2 from the screen," according to Patent Owner. *Id.* (citing Ex. 1001, 55:29–44).

We have reviewed the arguments and supporting evidence, as well as the claim language and the '850 patent Specification. We parse through Patent Owner's proposed construction below.

First, Patent Owner's proposed construction replaces "a . . . degree of propinquity" with "a specified proximity distance." PO Resp. 9. Accounting for the interchangeability of propinquity and proximity, Patent Owner in effect argues that *a degree of* means *a specified distance*. *Id.* The '850 patent Specification, however, does not support making this change. For example, the Specification's teachings as to propinquity focus on sensing an object's position when "the amount of light measured or the change in the amount of light measured exceeds a predetermined threshold." *See, e.g.*, Ex. 1001, 49:51–56. In other words, the Specification teaches that

"[t]ypically, the location of at least one detector element . . . , in which the amount of light measured or the change in the amount of light measured exceeds a predetermined threshold, corresponds to the location of the user's finger . . . ." *Id.* at 43:66–44:3. Thus, rather than making a specific distance calculation, the '850 patent Specification teaches measuring light to detect when it exceeds a predetermined threshold. *See, e.g.*, *id.* at 43:66–44:3, 49:51–56. Of course, as the '850 patent recognizes, there will be some resultant distance that corresponds to the predetermined threshold, but that distance is not measured and it does not mean that the '850 patent Specification teaches that such a distance is specified. *See, e.g.*, *id.* at 50:44–47 ("FIG. 23B shows finger 1606 located at a first distance D1 from display screen 1602, such that *the propinquity responsive input functionality senses* finger 1606 in propinquity to display screen 1602") (emphasis added). Rather, such a distance is an artifact of the predetermined threshold, and the range of closer distances also are included. *Id.*

Second, Patent Owner's construction replaces "predetermined" with "established in advance." PO Resp. 9. Patent Owner, however, does not explain how these terms differ, if at all. *Id.* at 16–17. Nor does Patent Owner explain how replacing "predetermined" with "established in advance" relates to the arguments about unpatentability in this case. *Id.* We conclude that "predetermined" has a clear plain and ordinary meaning, and does not require an express construction.

In sum, we find no principled basis to replace "a predetermined degree of propinquity" with "a specified proximity distance established in advance."

3. Summary

We conclude for "a predetermined degree of propinquity" that (i) "propinquity" means "proximity," (ii) its remaining language should be afforded its plain and ordinary meaning, and (iii) touching is not excluded.

B. Detector Assembly

Patent Owner argues that "detector assembly" "requires a distinct structure 'having an array of two or more detector elements that detect electromagnetic radiation.'" PO Resp. 17, 20–29; PO Sur-reply 6–11. Petitioner argues that this term should be afforded its plain and ordinary meaning. Pet. Reply 8–15. We first address the specific language of Patent Owner's proposed construction, and then address Patent Owner's arguments about a distinct structure.

1. Having an Array of Two or More Detector Elements

Patent Owner argues that "detector assembly" means "having an array of two or more detector elements that detect electromagnetic radiation." PO Resp. 17. Patent Owner argues that the plain claim language requires an "assembly," which is structure. PO Resp. 21. Patent Owner adds that the '850 patent Specification confirms that the claimed detector assembly has an array of two or more detector elements that detect electromagnetic radiation. *Id.* at 23 (citation omitted). For example, "[t]he '850 patent [S]pecification illustrates exemplary 'detector assembly 1100' in Fig. 17A and corresponding hardware components, including a 'detector *array* 1102,' 'a support substrate 1104,' and 'a cover layer 1106,'" according to Patent Owner. *Id.* at 24 (citing Ex. 1001, 36:1–54) (alteration in original); *see also id.* at 24–25 (citing Ex. 1001, 3:67–4:6, 38:15–19, 38:27–33, 45:45–48) (arguing that the Specification discloses having two arrays for a detector assembly). In addition, Patent Owner argues that "the '850 patent

[S]pecification distinguishes the 'detector assembly' hardware from other interface hardware configurations that relate to individual 'interspersed' detectors/emitters within a display." *Id.* at 26 (citing Ex. 1001, 11:15–19, 12:19–21, 12:66–13:1, Figs. 1C, 2A, 2B).

Having reviewed the arguments, we now parse through Patent Owner's proposed construction. First, we disagree with Patent Owner that a detector assembly requires having "an array." Nothing in the claim language of claim 15 requires that the detector assembly comprise an array. *See* Ex. 1001, 66:65–67:11. Moreover, Patent Owner does not explain clearly the meaning it ascribes to "array," which thus adds ambiguity rather than providing clarity as to the scope of the claims. For example, the Specification discloses that for many embodiments that a single detector assembly may be provided along only one edge. *E.g.*, Ex. 1001, 16:8–10. Accordingly, many embodiments in the Specification would be inconsistent with a multi-dimensional array requirement.

In addition, the '850 patent Specification discloses that a detector assembly can comprise "a linear arrangement of detector elements." *E.g.*, *id.* at 15:16–20, 26:65–66. It also discloses that a detector assembly can comprise "a plurality of discrete single-element detector elements." *Id.* at 36:41–43. Thus, the '850 patent Specification discloses arrangements other than an array for detector elements.

In addition, claim 17, which depends from claim 15, recites that the detector assembly comprises, *inter alia*, "an arrangement of detector elements." *Id.* at 67:15–18. And claim 18, which depends from claim 17, recites that "the arrangement of detector elements comprises one of: a plurality of discrete single-element detectors; an integrally formed multi-element detector array, and a plurality of discrete multi-element detectors."

Id. at 67:19–24. Thus, two of the recited arrangements for a detector assembly are not arrays. *Id.*; *see also* Tr. 75:14–23 (Patent Owner agreeing that "an array" can be struck from its proposed construction).

Second, we agree with Patent Owner that "detector assembly" requires "two or more detector elements." We find that this language is consistent with the plain and ordinary meaning for detector assembly in light of the '850 patent Specification. In particular, the '850 patent Specification repeatedly refers to a detector assembly as comprising multiple detector elements. *E.g.*, Ex. 1001, 3:7–8 ("[T]he detector assembly includes a support substrate and an arrangement of detector elements."), 15:16–20 (disclosing that the detector assembly comprises a linear arrangement of detector elements), 16:10–13 (same), 17:15–18 (same), 18:25–28 (same), 19:19–22 (same), 21:10–13 (same), 23:2–6 (same), 24:66–25:2 (same), 25:2–6 ("[T]he detector assembly 700 and the detector elements 710 are generally forward facing."), 26:65–66, 28:51–52, 30:44–45, 32:31–32, 34:17–18, 36:12–15, 36:36–38 ("[T]he detector assembly . . . includes an integrally formed multi-element detector array."), 36:41–46 ("[T]he detector assembly . . . includes a plurality of discrete single-element detector elements."), 36:49–51 ("[T]he detector assembly . . . includes a plurality of discrete multi-element detector elements."); *see also id.* at 2:60–62 (disclosing a "sensor includes a plurality of detector elements"), 3:30–32 (disclosing a "sensor includes a plurality of generally forward-facing detectors"). Notably, the '850 patent Specification does not disclose a detector assembly having only a single detector element. In addition, as we discuss above, dependent claims 17 and 18 recite having a plurality of detector elements. *Id.* at 67:15–25.

In light of the above, we are not persuaded by Petitioner's argument that "the claims are indifferent to whether . . . the detector assembly includes a single detector element or multiple detector elements." Pet. Reply 10 (citing Ex. 1035 ¶ 23). Petitioner provides no support from the intrinsic evidence for this argument. *Id.* Moreover, Dr. Bederson's cited testimony is conclusory and he provides no underlying factual support or reasoning for this testimony. *See* Ex. 1035 ¶ 23.

Third, the parties do not dispute that detector elements detect electromagnetic radiation. *See* PO Resp. 17–29; Pet. Reply 8–15. Moreover, that detector elements detect electromagnetic radiation is consistent with the '850 patent's Specification. *See* Ex. 1001, 4:44–54 (disclosing that detector elements detect electromagnetic radiation). Thus, consistent with its plain and ordinary meaning, we conclude that detector elements detect electromagnetic radiation.

In sum, we conclude that detector assembly means "two or more detector elements that detect electromagnetic radiation," which is consistent with its plain and ordinary meaning in light of the claim language and the '850 patent Specification.

2. Distinct Structure

Patent Owner argues, in the context of claim 15, that a detector assembly is a distinct and separate hardware structure from a pixel array. PO Resp. 17, 21; PO Sur-reply 7. More specifically, Patent Owner argues that because a pixel array and a sensor (which comprises a detector assembly) are separately listed elements that they should be construed as distinct components. PO Sur-reply 7 (citing *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254–55 (Fed. Cir. 2010)).

In addition, Patent Owner argues that claim 15's specific positional requirement for the detector assembly (i.e., "arranged at least one edge of a viewing plane defining plate") further evidences that the detector assembly is a distinct and separate hardware structure from a pixel array. PO Resp. 21 (citations omitted).

In addition, Patent Owner argues that the prosecution history of the '850 patent "confirms the claimed 'detector assembly' is a distinct hardware structure." PO Resp. 27. More specifically, Patent Owner argues that the prosecution history evidences "that the claimed 'detector assembly' structure included something different and distinguishable over [the prior art's] waveguide and individual transmitter/receiver components." *Id.* at 28; *see also id.* at 27 (citing Ex. 1004, 835) (arguing that "the claimed 'detector assembly' distinguishable and allowable over the prior art"); Ex. 1004, 835 ("Regarding claim 134, the prior art does not teach 'the at least one sensor comprises a detector assembly arranged at least one edge of a viewing plane defining plate.'").

In addition, Patent Owner argues that the claimed detector assembly cannot be interspersed in the pixel array. *See* PO Resp. 23. More specifically, Patent Owner argues that the '850 patent Specification consistently distinguishes between (i) having detector elements interspersed among pixels, and (ii) a detector assembly arranged at edges of the plate. *Id.* at 26 (citations omitted). Patent Owner adds that the claimed detector assembly cannot be integrated with the pixel array "because the claimed 'detector assembly' cannot be 'arranged' at an 'edge' of itself." PO Sur-reply 7 (citing *Becton*, 616 F.3d at 1254; PO Resp. 21–23).

Petitioner argues that the plain and ordinary meaning of detector assembly does not require a physically separate hardware structure. Pet.

Reply 9. Such a requirement is found nowhere in the claims, according to Petitioner. *Id.* Rather, Petitioner argues that the claims only recite having "a detector assembly arranged [at] at least one edge of a viewing plane defining plate." *Id.* at 10 (quoting Ex. 1001, 67:9–13) (alteration in original). Petitioner adds that the '850 patent Specification discloses that "the phrase 'at an edge' is to be interpreted broadly." *Id.* at 10 (citing Ex. 1001, 42:61–67). In addition, Petitioner argues that unlike *Becton*, which recited elements "connected to" each other, "[t]he claim terms here do not require separate structures to make sense." *Id.* at 9 (citing *Becton*, 616 F.3d 1255–56).

Having reviewed the parties' arguments, we agree with Petitioner and conclude that the claims do not require a detector assembly to be physically separate from (i.e., not interspersed with) a pixel array. *See, e.g.*, Ex. 1001, 66:65–67:11. This is not to say that a detector assembly (e.g., detector elements) and the pixels of a pixel array are not distinct components, because they are in that they are separate components and perform different functions. *See, e.g.*, *id.* at 4:44–54 (disclosing that detector elements detect electromagnetic radiation), 9:50–55 (disclosing display devices including a pixel array operative to provide a visually sensible output), 36:41–46 (disclosing discrete single-element detector elements that are commercially available). Rather, the gravamen of the parties' dispute is whether claim 15 covers embodiments of the '850 patent where detector elements are interspersed (at least along an edge) with pixels in a pixel array. Nothing in the claim language or Specification precludes claim 15 from covering those embodiments. *Id.*

In addition, claim 15 recites the location of a detector assembly as being "arranged at least one edge of a viewing plane defining plate." *Id.* at

67:9–11. The '850 patent broadly views what it means to be "at an edge," by including being behind, about, or along an edge within its scope. Ex. 1001, 42:61–67. Moreover, the '850 patent illustrates that detector elements can be located, *inter alia*, along and behind an edge while being interspersed in a pixel array. *See id.* at Fig. 18F (showing detector elements 1324 along and behind an edge of plate 1328); *cf. In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (considering drawings for what they reasonably disclose to one of ordinary skill in the art).

We find unavailing Patent Owner's reliance on *Becton*. First, unlike in *Becton* where the same structure was relied upon, detector elements and a pixel array are separate components that perform separate functions. *Becton*, 616 F.3d at 1255 (accused infringer asserting "that the spring means and the hinged arm can be the same structure"); Ex. 1001, 4:44–54, 9:50–55, 36:41–46. Second, in *Becton*, the claims required one claim element to be "connected to" another claim element, which would be nonsensical if they were the same structure. *See Becton*, 616 F.3d at 1255. Here, claim 15 recites a location of a detector assembly (i.e., "arranged at least one edge of a viewing plane defining plate"), which is compatible with the detector assembly being interspersed in a pixel array. *See, e.g.*, Ex. 1001, Fig. 18F.

We also find unavailing Patent Owner's arguments that the prosecution history of the '850 patent confirms that a detector assembly is a distinct hardware structure. PO Resp. 27. Simply put, Patent Owner overreads the Examiner's statement that the prior art does not teach "the at least one sensor comprises a detector assembly arranged at least one edge of a viewing plane defining plate." Ex. 1004, 835. The Examiner did not expressly state the reasons why the art failed to teach the allowed claim. *Id.* What aspect of the limitation the Examiner found was not taught remains

unclear. Notably, "because the prosecution history represents an ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Phillips*, 415 F.3d at 1315.

In addition, we have reviewed the testimony of the parties' experts on this issue, but we give it little, if any, weight in light of the clear disclosure of the claim language and Specification, which we discuss above. *See Wi-LAN*, 811 F.3d at 462.

IV. PRINCIPLES OF LAW

A 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 of the invention to a person having ordinary skill in the art. *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) objective evidence of non-obviousness, if present.[5] *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

[5] Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* PO Resp.

V. ALLEGED OBVIOUSNESS OVER REIME

Petitioner argues that Reime renders claims 15–18, 21, 22, and 30[6] of the '850 patent obvious. Pet. 3, 20–36, 45–46. We have reviewed the parties' arguments and the evidence of record. For the reasons that follow, we determine that Petitioner fails to show by a preponderance of the evidence that Reime renders these claims obvious.

A. Summary of Reime

Reime relates to a touch sensitive device in an electronic device or a wireless telecommunication terminal. Ex. 1010 ¶ 2. Figure 2A, reproduced below, shows touch pad device 1.

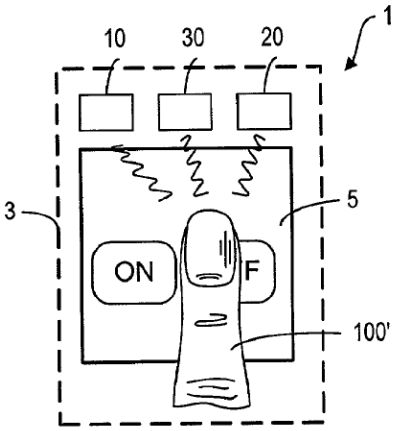

FIG. 2A

Figure 2A is a diagrammatic representation showing touch pad device 1 having optical sensor components 10, 20, and 30 placed near the top side of touch pad area 5. *Id.* ¶¶ 29, 76. As shown in Figure 2A, touch pad device 1 can be used to select the "ON" function or "OFF" function depending on the location of the "touching" point on touch pad area 5. *Id.* ¶ 75. When user's

[6] We address claims 31 and 41 in the ground asserting Yamaguchi. *Infra* Section VII.

finger 100' touches or approaches the pad area 5, the changes in the output signal of the receiver 30 show which function is selected. *Id.*

B. Challenged Claim 15

Among independent claim 15's limitations is "wherein the at least one sensor includes a detector assembly arranged at least one edge of a viewing plane defining plate." Ex. 1001, 67:9–11. Petitioner argues that Reime teaches this limitation. Pet. 32–33; Pet. Reply 20–21. For the reasons discussed below, we disagree. Below, we parse the limitation into three parts, and first address for context where we agree with Petitioner before addressing why we find Reime fails to teach the limitation.

a) Viewing Plane Defining Plate

Petitioner argues that Reime teaches "a viewing plane defining plate." Pet. 32–33. More specifically, Petitioner argues that Reime teaches that "[i]n a mobile device or other electronic device, the touch pad area 5 can be a display panel such as a liquid crystal display (LCD) 92." Pet. 32 (quoting Ex. 1010 ¶ 86). According to Petitioner, one of ordinary skill in the art "would have understood that a top surface of the LCD panel is a viewing plane-defining plate." *Id.* (citing Ex. 1002 ¶ 87). Additionally, Petitioner argues that "Reime includes a separate viewing plane defining plate on top of the LCD panel." *Id.* at 33. In particular, Reime discloses that "[p]referably, the touchpad device 1 also includes a cover plate to provide a touch surface," according to Petitioner. *Id.* (citing Ex. 1010 ¶ 86). Petitioner argues that "[t]he cover plate is a 'viewing plane defining plate,'" as shown in Reime's Figure 8B, where "a 'thin' cover plate 70 is on top of the LCD and defines the LCD viewing plane." *Id.* (citing Ex. 1010, Fig. 8B).

We agree with Petitioner that each of a top surface of the LCD panel and cover plate 70 is a viewing plane defining plate. Ex. 1010 ¶ 86, Fig. 8B.

b) Includes a Detector Assembly

Petitioner argues that Reime teaches that "the at least one sensor includes a detector assembly." Pet. 32–33; Pet. Reply 20. More specifically, Petitioner argues that Reime's "optical sensor components 10, 12, 20, 22, 30 and 32 are mounted in the peripheral area surrounding the LCD 92." Pet. 32–33 (quoting Ex. 1010 ¶ 86; citing Ex. 1010, Figs. 9A–9C). According to Petitioner, "Reime's optical components are the recited detector assembly." Pet. Reply 20 (citing Ex. 1035 ¶¶ 41–42). Petitioner argues that "Reime includes 'emitters' and 'receivers', or 'optical sensor components 10, 12, 20, 22, 30 and 32,' to detect a nearby object." *Id.* (citing Ex. 1010 ¶¶ 73, 86; Ex. 1002 ¶¶ 87–88; Ex. 2060, 125:11–15, 127:17–18 ("I'm pointing to elements 30 and 32, each as being parts of a detector assembly."); Ex. 1037, 134:8–13).

We disagree with Petitioner that Reime's emitters (10, 12, 20, and 22) serve to teach the claimed detector assembly. As we construe above, a detector assembly has "two or more detector elements that detect electromagnetic radiation." *Supra* Section III(B)(1). Reime's emitters emit light, rather than detect it. *E.g.*, Ex. 1010 ¶ 86. In contrast, Reime's receivers 30 and 32 receive light. *Id.*

Petitioner also specifically identifies receivers 30 and 32, and argues that they are part of a detector assembly. *See* Pet. Reply 20 (citing Ex. 2060, 127:17–18) (Dr. Bederson testifying that "I'm pointing to elements 30 and 32, each as being parts of a detector assembly"); *see also* Ex. 1035 ¶ 42 (testifying that Reime's "elements 30 and 32 are parts of a detector assembly").

We agree with Petitioner that Reime's receivers 30 and 32 are two detector elements that detect electromagnetic radiation (i.e., light), and thus, Reime's receivers 30 and 32, collectively, comprise a detector assembly.

c) Arranged at Least One Edge

Petitioner argues that Reime teaches that the detector assembly is "arranged at least one edge of a viewing plane defining plate." Pet. 33; Pet. Reply 20–21. For the reasons below, we disagree.

In the Petition, Petitioner argues that "[a]s shown in FIGs. 9A–9C, the emitters and detectors are positioned at the edge of the LCD screen." Pet. 33. Also in the Petition, Petitioner annotates Figure 8B with the label "Optical elements 10 and 12 at edge of LCD and cover plate." *Id.* (annotating Ex. 1010, Fig. 8B).

As we discuss above, Reime's emitters (e.g., elements 10 and 12) do not teach the detector assembly. *See supra* Section V(B)(1)(b). Thus, on this basis, we are not persuaded by Petitioner's arguments that are based on the placement of Reime's emitters.

In its Reply, however, Petitioner focuses on detectors 30 and 32 (which as we discuss above collectively teach a detector assembly), and argues that "detectors 30 and 32 are 'along the edge' because 'elements 30 and 32 of Figure 9E would appear behind 10 and 12 from [the] particular view in Figure 8.'" Pet. Reply 20 (citing Ex. 1035 ¶ 42; Ex. 1037, 169:2–17; Ex. 2060, 124:17–125:15; Ex. 1010 ¶¶ 69, 89). Petitioner argues that "[t]his is consistent with the '850's specification: '"at edges" is to be interpreted broadly.'" *Id.* (quoting Ex. 1001, 37:23–29).

In addition, Petitioner provides an annotated combination of Reime's Figures 8B and 9E in support of its arguments. Pet. Reply 21.

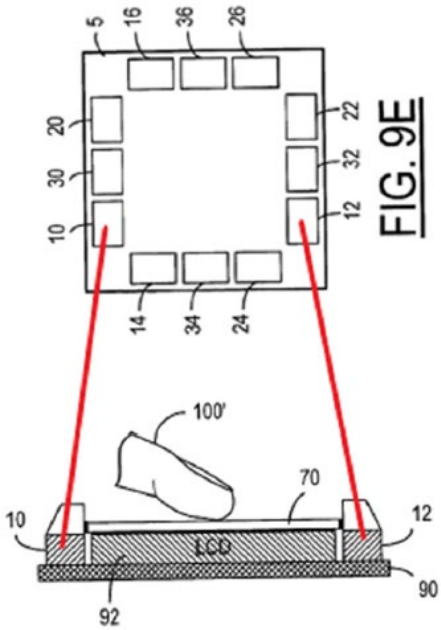

FIG. 8B

FIG. 9E

Figure 8B "is a cross-sectional side view showing a touch pad device having an LCD and a thin cover on top of the LCD for touching." Ex. 1010 ¶ 49. Figure 9E "is a diagrammatic representation showing a touch pad device having four groups of optical sensor components placed within the touch pad area." *Id.* ¶ 56. In making this combination of figures, Petitioner rotates Figure 9E ninety degrees counterclockwise and places it higher up on the page above Figure 8B. Pet. Reply 21. Petitioner then annotates the combined figures by drawing a red line from element 10 on Figure 8B to element 10 on Figure 9E, and drawing a second red line connecting elements 12 on each of the figures. *Id.*

We find that Petitioner fails to show that Reime's detector assembly (i.e., receivers 30 and 32, collectively) is "arranged at least one edge of a viewing plane defining plate." Petitioner fails to clearly identify how Reime teaches this part of the limitation, including failing to clearly identify what "one edge" Petitioner contends the detector assembly (i.e., receivers 30 and

32, collectively) is arranged at. *See* Pet. Reply 20–21. As best we can determine from the Reply, Petitioner argues that receivers 30 and 32 are "along the edge" of the plate because receivers 30 and 32 are coplanar and looking from a side view (e.g., Figure 8B), both 30 and 32 would be "along" the edge that constitutes the height of the plate (e.g., cover plate 70, which Reime describes as thin). *Id.* Petitioner then argues that Reime teaches this limitation because "at an edge" is to be interpreted broadly as including structures which are located along an edge. *Id.*

We are not persuaded by Petitioner's arguments. We agree that the '850 patent states the following:

> It is appreciated that the phrase "at an edge" is to be interpreted broadly as including structures which are located behind an edge, as in the embodiments shown in FIGS. 10A–10D, 11A–11lD, 15A–15D and 16A–16D3[,] about an edge as in the embodiments shown in FIGS. 9A–9D and 14A–14D, and along an edge as in the embodiments shown in FIGS. 4–7, 8A–8D, 12A–12D and 13A–13D.

Ex. 1001, 42:61–67. However, we do not view this statement to mean that any structures that are coplanar necessarily are "along an edge," and thus, also "at an edge." The embodiments the statement identifies have detector assemblies that are along an edge by being adjacent (next to) an edge of the plate. *See* Ex. 1001, Figs. 4–7, 8A–8D, 12A–12D, 13A–13D. In addition, the claim recites that the edge is of a "viewing plane defining plate." A side view of a device (e.g., Fig. 8B) is inconsistent with a viewing plane (i.e., looking down on the device), such as shown in Fig. 9E.

In addition, to the extent that Petitioner is arguing that both receiver elements 30 and 32 (which together teach a detector assembly—two or more detector elements) are sufficiently close to one edge, we disagree. Pet. Reply 20. Rather, Reime teaches that each of these receivers 30 and 32 are

centered on opposite edges of the plate. *See, e.g.*, Ex. 1010, Figs. 9C–9F. And an emitter (e.g., elements 10 and 12) is between each receiver and the edge on either end. *E.g.*, *id.*

d) Summary

In sum, we find that Petitioner does not show by a preponderance of the evidence that Reime teaches "wherein the at least one sensor includes a detector assembly arranged at least one edge of a viewing plane defining plate." Thus, Petitioner has not demonstrated by a preponderance of the evidence that claim 15 of the '850 patent would have been obvious to one of ordinary skill in the art in view of Reime.

C. Challenged Claims 16–18, 21, 22, and 30

Claims 16–18, 21, 22, and 30 depend (directly or indirectly) from independent claim 15, and thus, incorporate claim 15's limitations. We determine above that Reime fails to teach a limitation of claim 15. In addition, the Petition does not present any information with respect to these dependent claims that addresses the deficiencies discussed above regarding independent claim 15. Pet. 34–46. Thus, Petitioner has not demonstrated by a preponderance of the evidence that claims 16–18, 21, 22, and 30 of the '850 patent would have been obvious to one of ordinary skill in the art in view of Reime.

VI. ALLEGED OBVIOUSNESS OVER REIME AND HINCKLEY

Petitioner argues that the combination of Reime and Hinckley renders claims 15–18, 21, 22, 26, and 30[7] obvious. Pet. 21–46. We determine above that Reime fails to teach a limitation of independent claim 15. *See*

[7] We address claims 31 and 41 in the ground asserting Yamaguchi. *Infra* Section VII.

supra Section V(B). For this ground, Petitioner relies on the same showing from Reime for that missing limitation. Pet. 32–33. In addition, claims 16–18, 21, 22, 26, and 30 depend (directly or indirectly) from independent claim 15, and thus, incorporate claim 15's limitations. The Petition does not present any information with respect to these dependent claims that addresses the deficiencies discussed above regarding independent claim 15. Pet. 34–46. Thus, Petitioner has not demonstrated by a preponderance of the evidence that claims 15–18, 21, 22, 26, and 30 of the '850 patent would have been obvious to one of ordinary skill in the art in view of Reime and Hinckley.

VII. ALLEGED OBVIOUSNESS OVER YAMAGUCHI

Petitioner argues that Yamaguchi renders obvious claims 31 and 41. Pet. 4, 53–75. We have reviewed the parties' arguments and the evidence of record. For the reasons that follow, we determine that Petitioner shows by a preponderance of the evidence that Yamaguchi renders claims 31 and 41 obvious.

A. Summary of Yamaguchi

Yamaguchi relates to an image display device including the capability of detecting an object position. Ex. 1009 ¶ 3. Figure 13 of Yamaguchi, reproduced below, shows the general configuration of an image display device. *Id.* ¶ 158.

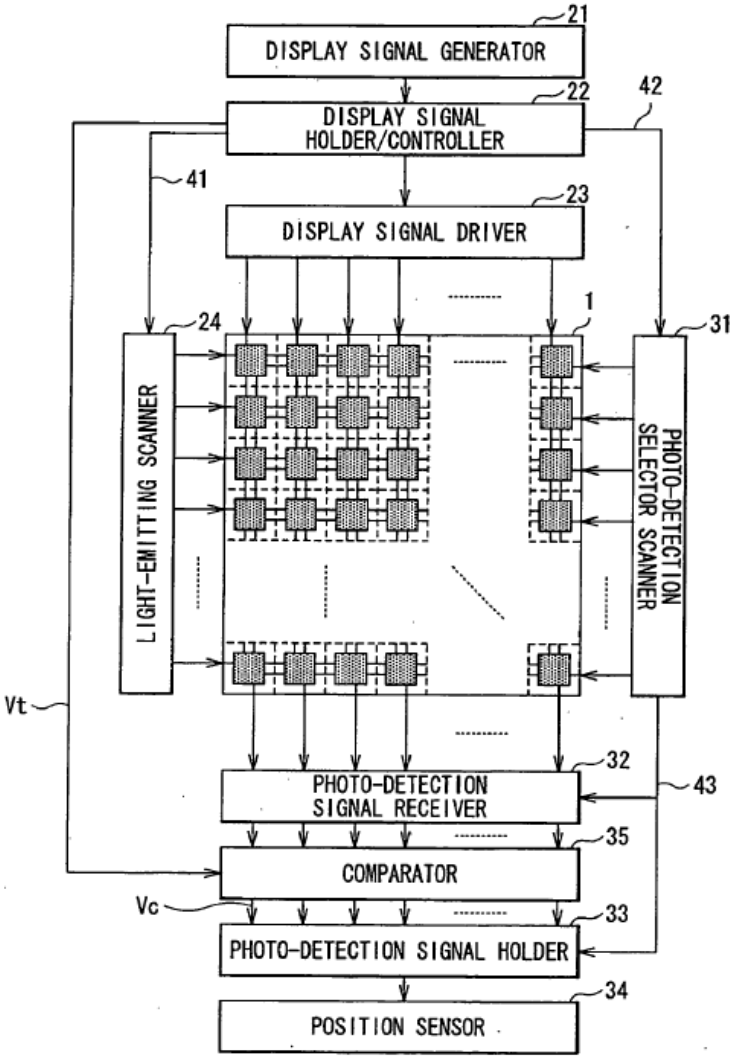

FIG. 13

Figure 13, above, illustrates an image display device that includes display 1, display signal driver 23, light-emitting scanner 24, photo-detection signal selector scanner 31, photo-detection signal receiver 32, comparator 35, photo-detection signal holder 33, and position sensor 34. *Id.*

Display 1 includes an organic or inorganic electroluminescence display or liquid crystal display (LCD) including a matrix of a plurality of picture elements 11 over the whole surface. *Id.* ¶ 96. Each picture element 11 includes a light-emitting/photo-detection cell (CWR), including one light-

emitting/photo-detection device. *Id.* Scanner 24 and driver 23 act to drive each light-emitting/photo-detection cell CWR for light emission, and scanner 31 acts to drive each cell CWR for photo-detection. *Id.* ¶ 98.

Comparator 35 compares the photo-detection signal outputted by photo-detection signal receiver 32 to a threshold voltage signal Vt, which is a predetermined voltage, outputted by display signal holder/controller 22. *Id.* ¶ 159. Comparator 35 converts the photo-detection signal into digital data "1" when the photo-detection signal has a higher voltage than the threshold voltage signal Vt, or comparator 35 converts the photo-detection signal into digital data "0" when the photo-detection signal has a lower voltage than the threshold voltage signal Vt. *Id.* Comparator 35 outputs the digital data (i.e., a comparator output signal Vc) to photo-detection signal holder 33. *Id.* Comparator 35 is interposed between photo-detection signal receiver 32 and photo-detection signal holder 33, so that digital data is inputted to and handled by photo-detection signal holder 33 and position sensor 34. *Id.* ¶ 162.

B. Challenged Claim 31

1. Position Sensing Assembly

Claim 31's preamble recites "[a] position sensing assembly." Ex. 1001, 68:51. Petitioner argues that Yamaguchi teaches this preamble. Pet. 55–57. In particular, Petitioner argues that Yamaguchi "relates to an image display device including the capability of detecting an object position and the like, and a method of driving an image display device." *Id.* at 55 (quoting Ex. 1009 ¶ 3); *see also id.* at 55–56 (citing Ex. 1009, Fig. 13) (arguing that Yamaguchi illustrates an assembly in accordance with its teachings). Petitioner argues that "Yamaguchi discloses that when a target object such as a finger is brought into contact or close proximity with the

display . . ., the detecting process takes place to detect its position." *Id.* at 56–57 (citing Ex. 1009 ¶ 134, Fig. 5).

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches claim 31's preamble.

2. Plate Defining a Surface

Claim 31 further recites "a plate defining a surface." Ex. 1001, 68:52. Petitioner argues that Yamaguchi teaches this limitation. Pet. 57–58. In particular, Petitioner argues that Yamaguchi teaches an "'image display device' that includes a display 1." *Id.* at 57 (citing Ex. 1009 ¶ 95). Petitioner argues that the display includes a LCD and light emitting and detecting pixels. *Id.* (citing Ex. 1009 ¶ 96). Petitioner argues that Yamaguchi teaches having a transparent substrate, which "defines the surface of the display of the LCD and emitters/detectors." *Id.* at 57–58 (citing Ex. 1009, Fig. 3). "[T]he transparent substrate 12A is a plate defining the surface of the display," according to Petitioner. *Id.* at 58.

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches this limitation.

3. At Least One Pixel Array

Claim 31 further recites the following:

> at least one pixel array including a plurality of detector elements configured to detect electromagnetic radiation at a baseline level, the at least one pixel array being configured to sense a position of an object with respect to the surface according to locations of ones of the plurality of detector elements at which

> at least one of the amount of radiation detected and the change in the amount of radiation detected exceed a predetermined threshold, the at least one pixel array being configured to sense at least a position of at least one object with respect to the at least one pixel array when the at least one object has at least a predetermined degree of propinquity to the at least one pixel array.

Ex. 1001, 68:53–65. The parties dispute whether Yamaguchi teaches this limitation. We address the parties' arguments below by parsing this limitation into three parts.

a) At Least One Pixel Array

Petitioner argues that Yamaguchi teaches "at least one pixel array including a plurality of detector elements configured to detect electromagnetic radiation at a baseline level," as recited in claim 31. Pet. 59–61. More specifically, Petitioner argues that Yamaguchi teaches "a display that has a pixel array made up of a number of pixels that include emitter and detector elements, CWR 11." *Id.* at 59 (citing Ex. 1009, Fig. 1). Petitioner argues that Yamaguchi teaches that "the display 1 includes an organic or inorganic EL (electroluminescence) display or LCD . . . including a matrix of a plurality of picture elements 11 over the whole surface," and that "[e]ach picture element 11 includes a light-emitting/photo-detection cell CWR including one light-emitting/photo-detection device." *Id.* (quoting Ex. 1009 ¶ 96). Petitioner argues that Yamaguchi teaches that "the light-emitting/photo-detection device may include any other device, provided that the device has the function of light emission and the function of photo-detection[,such as] an LED (light emitting diode) device or the like." *Id.* (quoting Ex. 1009 ¶ 110) (alteration in original).

In addition, Petitioner argues that Yamaguchi teaches "that the detector elements are configured to detect radiation at a baseline level,

including for example baseline ambient light." *Id.* at 61. According to Petitioner, Yamaguchi's "image display device 'may be configured to determine the intensity of ambient light in accordance with one or more photo-detection signals, . . . so as to perform detection of the target object allowing for the effect of the ambient light.'" *Id.* (quoting Ex. 1009 ¶ 21; citing *id.* ¶¶ 178, 357, claim 6) (alteration in original). Petitioner adds that Yamaguchi teaches that "a small DRi signal between times t4 and t7 is captured with the emitters off, and 'is thus regarded as the photo-detection signal resulting from ambient light.'" *Id.* (quoting Ex. 1009 ¶ 187; citing *id.* at Figs. 22E–F). "Yamaguchi thus determines the intensity of a baseline level of ambient light when it detects ambient light," according to Petitioner. *Id.* (citing Ex. 1002 ¶¶ 159–160).

After reviewing Petitioner's arguments and evidence for this first part of the limitation, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches "at least one pixel array including a plurality of detector elements configured to detect electromagnetic radiation at a baseline level."

b) Sense a Position

Petitioner argues that Yamaguchi teaches "the at least one pixel array being configured to sense a position of an object with respect to the surface according to locations of ones of the plurality of detector elements at which at least one of the amount of radiation detected and the change in the amount of radiation detected exceed a predetermined threshold," as recited in claim 31. Pet. 61–64. More specifically, Petitioner argues that Yamaguchi teaches "when a target object 15 such as a finger is brought into contact or close proximity with the display 1, light LW1 emitted from the light-emitting/

photo-detection cell CWR23, for example, is reflected by the target object 15." *Id.* at 62 (quoting Ex. 1009 ¶ 118; citing *id.* at Fig. 5). Petitioner argues that "[t]he reflected light LR1 will enter into a light-emitting/photo-detection device cells near CWR23, such as CWR24, but not those detection cells far away from CWR23." *Id.* Petitioner argues that "[i]n this way, position detection is performed based on the relative locations of the object, emitter, and nearby (as opposed to far away) detector elements." *Id.* "Thus, Yamaguchi teaches sensing a position of the finger according to the locations of the detectors and emitters," according to Petitioner. *Id.* (citing Ex. 1002 ¶ 168).

In addition, Petitioner argues that "the positioning is based on sensing the signal at detectors that exceed a predetermined threshold." *Id.* (citing Ex. 1009 ¶¶ 159, 168, 170–171). According to Petitioner, Yamaguchi teaches a comparator 35, which "compares the photo-detection signal outputted by the photo-detection signal receiver 32 to a *threshold voltage* signal Vt, which is a *predetermined voltage*, output by the display signal holder/controller 22." *Id.* at 62–63 (quoting Ex. 1009 ¶ 159; citing *id.* at Fig. 13). Petitioner argues that "[t]he predetermined threshold voltage is a predetermined threshold as claimed," and that "[i]t is a threshold that is determined in advance based on an expected voltage output." *Id.* at 63 (citing Ex. 1002 ¶¶ 163–164).

In addition, Petitioner argues that Yamaguchi illustrates the predetermined threshold in Figures 14E and 14F, for example, where "Vt is the predetermined threshold, and DRi is the 'signal on a data read line DRi connected to the cells CWRi' that is being compared to that threshold." *Id.* (quoting Ex. 1009 ¶ 160; citing *id.* at Fig. 14E–14F).

In addition, Petitioner argues that Yamaguchi further illustrates that "a position of the object with respect to the pixels on the display surface is determined from the output of those adjacent sensors in regions W1–W3, shown" in Figures 17A–17C, respectively. *Id.* Petitioner argues that for the shaded pixels shown in these "figures, the amount of detected signal is larger than the predetermined threshold voltage Vt, which indicates the position of the nearby object." *Id.* at 63–64 (citing Ex. 1009, Figs. 17A–17C, ¶ 170; Ex. 1002 ¶¶ 165–166); *see also* Ex. 1009 ¶ 170 ("In FIGS. 17A to 17C, each of photo-detection signal detection regions W1 to W3 is the region where the amount of photo-detection signal . . . is larger than the threshold voltage Vt, and this indicates that the object is detected at the position of each region.").

After reviewing Petitioner's arguments and evidence for this second part of the limitation, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches "the at least one pixel array being configured to sense a position of an object with respect to the surface according to locations of ones of the plurality of detector elements at which at least one of the amount of radiation detected and the change in the amount of radiation detected exceed a predetermined threshold."

c) When at Least a Predetermined Degree of Propinquity

Petitioner argues that Yamaguchi teaches "the at least one pixel array being configured to sense at least a position of at least one object with respect to the at least one pixel array when the at least one object has at least a predetermined degree of propinquity to the at least one pixel array," as

recited in claim 31. Pet. 65–66. More specifically, Petitioner argues that Yamaguchi's Figure 5 "illustrates how the image display device senses a nearby object 'when a target object 15 such as a finger is brought into contact or close proximity with the display 1.'" *Id.* at 65 (quoting Ex. 1009 ¶ 118). Figure 5 is reproduced below, as annotated by Petitioner. *Id.*

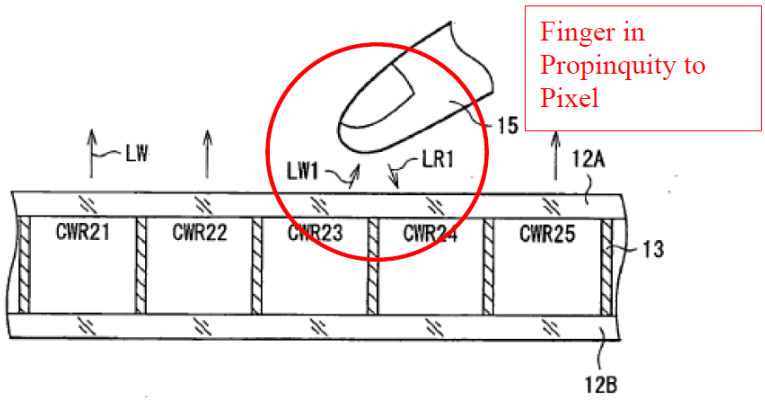

FIG. 5

Figure 5 "is a schematic illustration showing an example of a process for detecting a target object, which is executed by the image display device," according to Yamaguchi's teachings. Ex. 1009 ¶ 32. Petitioner annotates this figure with a red circle encircling the finger's tip, LW1, and LR1, as well as labels this figure in red as showing a "Finger in Propinquity to Pixel." Pet. 65 (annotating Figure 5).

Petitioner argues that one of ordinary skill in the art "would recognize from this teaching that detection of the object in 'close proximity' suggests establishing the threshold to respond to and sense an object at some predetermined degree of propinquity, i.e., a set level of nearness to the device, to avoid false positives and ensure 'accuracy of detection.'" *Id.* at 65–66 (citing Ex. 1009 ¶ 171; Ex. 1002 ¶ 169). Petitioner adds that "sensing the object within a predetermined degree of propinquity or proximity would have been an obvious modification to [one of ordinary skill in the art] in

view of Yamaguchi's suggestion that the threshold voltage can be adjusted based on the 'purpose of the detection' to account for, among other things, 'position detection' within a set nearness or range to the device." *Id.* at 66 (citing Ex. 1009 ¶ 171; Ex. 1002 ¶ 169).

Patent Owner disputes that Yamaguchi teaches this third part of the limitation. PO Resp. 69–71. More specifically, Patent Owner argues that "Yamaguchi teaches determining x-y coordinates of an object in contact with a touch panel," and "mentions its touch panel can detect objects 'in proximity to the display,' but only in the context of determining the x-y position on the display." *Id.* at 69 (citing Ex. 1009 ¶¶ 104, 119). Patent Owner adds that "Yamaguchi is incapable of determining or calculating any 'z' position of an object," and that "the object's actual z-distance is irrelevant to Yamaguchi's x-y calculations." *Id.* (citing Ex. 1009 ¶¶ 161–162, 169; Ex. 2056 ¶ 152). In addition, Patent Owner argues that Yamaguchi fails to teach this part of the limitation because "Yamaguchi is directed to determining x-y positions corresponding to a touch event and/or objects in contact with the display." *Id.* at 70 (citing Ex. 1009 ¶¶ 19, 101, 104, 134).

Having considered the arguments and cited evidence, we find that Yamaguchi teaches this third part of the limitation. Importantly, Yamaguchi describes sensing position "when a target object 15 such as a finger is brought into contact or *close proximity* with the display 1." Ex. 1009 ¶ 118 (emphasis added); *see also id.* ¶¶ 104 ("This makes it possible to determine the position of an object in contact with or *in close proximity* to the display device.") (emphasis added), 134 (describing "when a target object such as a finger is brought into contact or *close proximity* with the display 1, the detecting process takes place to detect its position and the like") (emphasis

added), 169 (describing comparing "the amount of each photo-detection signal to a predetermined threshold voltage V_t thereby detecting where an object in contact with or *in close proximity* to the display device is situated") (emphasis added). As emphasized in italics in each of Yamaguchi's disclosures, Yamaguchi describes position detection when the object is in "close proximity," but not touching. Contrary to Patent Owner's argument, Yamaguchi expressly describes sensing the x-y position of an object when "the position sensor 34 and the comparator 35 or 351 compare the amount of each photo-detection signal to a predetermined threshold voltage V_t," and detect "an object in contact with or *in close proximity to* the display." *See, e.g.*, Ex. 1009 ¶ 169 (emphasis added).

We also agree with Petitioner's contentions and credit and afford significant weight to Dr. Bederson's testimony that a person having ordinary skill in the art would have recognized from Yamaguchi's disclosures of position detection when an object is in "close proximity" that the threshold is established to respond to and sense an object at some predetermined degree of propinquity, i.e., a level of nearness to the device has been set. Pet. 65–66; Ex. 1002 ¶ 169 (citing Ex. 1009 ¶¶ 118, 171) (testifying that one of ordinary skill in the art "would recognize from [Yamaguchi's] teaching that detection of the object in 'close proximity' suggests establishing the threshold to respond to and sense an object at some predetermined degree of propinquity"). In fact, Yamaguchi expressly teaches that "users may optionally change the threshold voltage V_t according to the properties of the object (e.g., a size, a surface state (e.g., reflectivity, a color, roughness, and the like), etc.), the purpose of detection (e.g., position detection, size detection, color detection, and the like), the accuracy of detection, and so on." Ex. 1009 ¶ 171. Yamaguchi also teaches about different threshold

voltage settings and the effect those setting having on x-y position detection. Ex. 1009 ¶ 170 (describing that Figures 17A–17C illustrate regions "where the amount of photo-detection signal of the light emitting/photo-detection cell CWR is larger than the threshold voltage V_t, and this indicates that the object is detected at the position of each region").

In addition, we find unavailing Patent Owner's arguments concerning Yamaguchi being incapable of calculating a "z" position, and that "the object's actual z-distance is irrelevant to Yamaguchi's x-y calculations." PO Resp. 69. These arguments relate to calculating an object's actual distance away, but the plain language of this limitation does not require such a calculation. *See* Ex. 1001, 68:53–65. The plain and ordinary meaning of "position" is broad enough to cover both two-dimensional and three-dimensional positions, as evidenced by the '850 patent's Specification. *See, e.g.*, Ex. 1001, 6:12–14 (describing the position of an object as including a two-dimensional position or a three-dimensional position). Thus, sensing a specific z position (i.e., the third dimension) is not required by the limitation.

In addition, Patent Owner argues that Petitioner in its Reply makes new arguments and advances new theories regarding Yamaguchi teaching "a predetermined degree of propinquity." PO Sur-reply 23–25. This argument is moot. Because we find that Petitioner demonstrates that Yamaguchi teaches this limitation based on our review of the Petition and Patent Owner's Response, we need not consider the arguments Petitioner makes in the Reply about this issue. Moreover, any arguments that Patent Owner makes in its Sur-reply regarding this issue that were not made by Patent Owner in its Response are new and are not considered.

After reviewing the parties' arguments and evidence for this third part of the limitation, we determine that Petitioner demonstrates by a

preponderance of the evidence that Yamaguchi teaches "the at least one pixel array being configured to sense at least a position of at least one object with respect to the at least one pixel array when the at least one object has at least a predetermined degree of propinquity to the at least one pixel array."

4. Circuitry Configured to Receive

Claim 31 further recites "circuitry configured to receive an output from the at least one pixel array and to provide a non-imagewise input that is representative of the position of the at least one object relative to the at least one pixel array." Ex. 1001, 68:66–69:2. Petitioner argues that Yamaguchi teaches this limitation. Pet. 70–72. In particular, Petitioner argues that Yamaguchi teaches "circuitry coupled to and receiving an output from the at least one pixel array." *Id.* at 70. According to Petitioner, Yamaguchi's Figure 13 illustrates that "the position sensing assembly disclosed by Yamaguchi has a photo-detection signal receiver 32 configured to receive output from the CWR pixel array," and that "[t]he circuitry also includes, among other things, comparator 35, photo-detection signal holder 33, and a position sensor 34 that determines the position of the object relative to the pixel array." *Id.* (citing Ex. 1009, Fig. 13, ¶¶ 157–159).

In addition, Petitioner argues that "Yamaguchi further discloses that the circuitry is configured to provide 'non-imagewise' results from the circuitry." *Id.* at 71. Petitioner argues that, for example, "FIG. 14G shows a comparator output signal Vci connected to the cells CWR." *Id.* (citing Ex. 1009, Fig. 14G, ¶ 160). "Vci is 'non-imagewise' because it is a 1 or 0 indicative of whether the signal from the object, as detected by the respective detector, exceeds the predetermined threshold," according to Petitioner. *Id.* at 71–72 (citing Ex. 1002 ¶ 178). Petitioner argues that Yamaguchi teaches that "[o]utput signal Vci (see FIG. 14G) is '1' when the

amount of signal on the data read line DRi (see FIG. 14E) is larger than the predetermined threshold voltage signal Vt (see FIG. 14F), or the comparator output signal Vci (see FIG. 14G) is '0' when the amount of signal on the data read line DRi (see FIG. 14E) is smaller than the predetermined threshold voltage signal Vt (see FIG. 14F)." *Id.* at 72 (quoting Ex. 1009 ¶ 161). Petitioner argues that "[a]n output of a value '1' or '0' is not an image." *Id.*

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches this limitation.

5. Change in the Amount of Radiation

Claim 31 further recites "wherein the change in the amount of radiation detected results from ones of the plurality of detector elements detecting reflected light from the object in addition to detecting the radiation at the baseline level." Ex. 1001, 69:3–6. Petitioner argues that Yamaguchi teaches this limitation. Pet. 72–74. In particular, Petitioner argues that "Yamaguchi teaches that the change in the amount of radiation detected results from ones of the plurality of detector elements detecting reflected light from the object in addition to detecting the radiation at the baseline level." *Id.* at 73 (citing Ex. 1009, Figs. 22E–F). Petitioner argues that "[t]he signal output from the CWR detector is 'DRi[,'] . . . ." *Id.* (citing Ex. 1009, Fig. 22E). "The small DRi signal between times t4 and t7 is captured with the emitters off, and "is thus regarded as the photo-detection signal resulting from ambient light," according to Petitioner. *Id.* (citing Ex. 1009 ¶ 187, Fig. 22E). Petitioner argues that "[t]his background ambient light is the baseline signal." *Id.*

According to Petitioner, Yamaguchi teaches that "[d]uring the time period from t8 to t9, the threshold voltage is raised by an amount equal to the detected ambient baseline." *Id.* (citing Ex. 1009, Fig. 22F) (referring to Vt signal). Petitioner argues that Yamaguchi teaches that "[d]uring a time period between time t8 and t9 . . . , the threshold voltage Vt is then set higher, allowing for the photo-detection signal resulting from ambient light detected," and that "[i]n this manner, the threshold is set allowing for the effect of ambient light." *Id.* (quoting Ex. 1009 ¶ 187) (alteration in original). According to Petitioner, "the baseline level of ambient light is detected during periods t4 through t7, and the reflected light in addition to the baseline is detected during periods t8 through t9, which represents the change in the amount of radiation detected." *Id.* (citing Ex. 1009, Fig. 22F, ¶ 187).

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Yamaguchi teaches this limitation.

6. Summary

In summary, based on the arguments and evidence of record, we find that Petitioner demonstrates by a preponderance of the evidence that claim 31 is unpatentable under 35 U.S.C. § 103(a) over Yamaguchi.

C. Challenged Claim 41

Petitioner argues, with specific cites to Yamaguchi, that Yamaguchi teaches the limitations recited in claim 41. Pet. 74–75. Patent Owner's Response does not separately address Petitioner's arguments directed to this claim. PO Resp. 75.

Based on the evidence and arguments of record, we find that Petitioner demonstrates by a preponderance of the evidence that claim 41 would have been obvious to one of ordinary skill in the art over Yamaguchi.

VIII. ALLEGED OBVIOUSNESS OVER YAMAGUCHI AND HINCKLEY

Petitioner argues that the combination of Yamaguchi and Hinckley renders obvious claims 31 and 41. Pet. 4, 53–75. Thus, this ground of unpatentability challenges the same claims we already determine are unpatentable over Yamaguchi. *See supra* Section VII (determining Petitioner shows that claims 31 and 41 are unpatentable). Under the circumstances of this case, analyzing an additional ground challenging the same claims, which we have determined to be unpatentable, would not be an efficient use of the Board's time and resources. *See Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) ("We agree that the Board need not address issues that are not necessary to the resolution of the proceeding.").

Accordingly, we do not reach this ground. *Cf. In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (determining once a dispositive issue is decided, there is no need to decide other issues).

IX. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude certain of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) arguing that the testimony is not relevant or has little probative value. Mot. 1. In particular, Patent Owner argues that we should exclude paragraphs 7, 15–18, 20, 22–23, 26–

27, 32, 35, 37–40, 51, 54–56, and 58–59 under Federal Rules of Evidence 401 and 403. Mot. 1.

Patent Owner first argues that paragraphs 7, 15–18, 20, 22–23, and 26–27 "are introduced for the sole purpose of supporting attorney argument against Patent Owner's proposed claim constructions." *Id.* Second, Patent Owner argues that paragraphs 32, 35, 37–40, and 51 "are introduced for the sole purpose of supporting attorney argument in support of Petitioner's Grounds 1–3." *Id.* at 2. Third, Patent Owner argues that paragraphs 54–56 and 58–59 "are introduced for the sole purpose of supporting attorney argument in support of Petitioner's Ground 4." *Id.* at 3.

Patent Owner relies on the Federal Rules of Evidence 401 through 403 as legal support for its arguments that the identified paragraphs are inadmissible. *See generally id.* In particular, Patent Owner argues that the testimony in these paragraphs is not adequately supported by record, and as such does not constitute proper opinion testimony. *Id.* at 1–3. Patent Owner adds that the testimony mischaracterizes the record and the teachings of the '850 patent or prior art, and is confusing on this basis. *Id.*

In its Opposition, Petitioner provides a table including the testimony in each contested paragraph, along with citations to the record set forth in that testimony, and the corresponding argument in Patent Owner's Response that the testimony responds to. Opp. 2–8. Petitioner argues, in contrast to Patent Owner's arguments, Dr. Bederson's testimony directly responds to arguments in Patent Owner's Response and, therefore, is highly relevant and probative of the issues raised by Patent Owner. *Id.* at 1, 8–9. Petitioner also argues that Bederson's testimony "is replete with citations to the record" and is "well-supported" proper expert testimony. *Id.* at 1 (citing Fed. R. Evid. 702–704).

Moreover, Petitioner argues that the probative value of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) is not outweighed by any unfair prejudice or confusion. Opp. 8–9. Petitioner argues that Patent Owner's arguments in that regard are conclusory and unsupported. *Id.* at 10. Petitioner further argues any "alleged 'prejudice'" is Patent Owner's "own making" because Patent Owner did not take a deposition to cross-examine Dr. Bederson regarding his testimony in his Reply Declaration. *Id.* at 1.

We find persuasive Petitioner's arguments on the relevancy and the probative value of the expert testimony at issue. Patent Owner does not provide any specific explanations as to why the testimony at issue is irrelevant or has little or no probative value. Federal Rule of Evidence 401 provides that evidence is relevant if it "has any tendency to make a fact more or less probable than it would be without the evidence" and "the fact is of consequence in determining the action." Fed. R. Evid. 401; Fed. R. Evid. 402 ("Relevant evidence is admissible."). Courts have characterized the relevance threshold as being "very low." *United States v. White*, 692 F.3d 235, 246 (2nd Cir. 2012) (quoting *United States v. Al-Moayad*, 545 F.3d 139, 176 (2nd Cir. 2008)). Under this standard, we find that Dr. Bederson's testimony is relevant. Additionally, under the circumstances here, a bench trial, Rule 403 has limited applicability. *See, e.g.*, *Schultz v. Butcher III*, 24 F.3d 626, 632 (4th Cir. 1994). Patent Owner does not provide explanation as to why there would be prejudice to it and we can weigh the evidence without improper inference. Accordingly, we do not find a basis for exclusion under Federal Rule of Evidence 403.

We agree with Petitioner (Opp. 1) that Patent Owner's arguments go to the weight we should give Dr. Bederson's testimony, not its admissibility. Patent Owner has not been left without an opportunity to address the Reply

argument and evidence. In fact, Patent Owner filed a Sur-reply responding to Petitioner's arguments and evidence in its Reply regarding claim construction and patentability. *See generally* PO Sur-reply. Also, Patent Owner had the opportunity, but declined to depose Dr. Bederson on his Reply Declaration.

For the reasons given, we *deny* Patent Owner's Motion to Exclude.

X. CONCLUSION[8]

Based on the full record, we determine that Petitioner shows by a preponderance of the evidence that claims 31 and 41 are unpatentable over Yamaguchi. We also determine that Petitioner does not show by a preponderance of the evidence that (i) claims 15–18, 21, 22, and 30 are unpatentable over Reime and (ii) claims 15–18, 21, 22, 26, and 30 are unpatentable over the combination of Reime and Hinckley. We also deny Patent Owner's Motion to Exclude.

Claim(s)	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
15–18, 21, 22, 30, 31, 41	103(a)	Reime[9]		15–18, 21, 22, 30

[8] 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).

[9] Because we determine that claims 31 and 41 challenged in this ground are unpatentable under § 103(a) over Yamaguchi, we decline to address these claims for this ground.

15–18, 21, 22, 26, 30, 31, 41	103(a)	Reime, Hinckley[10]		15–18, 21, 22, 26, 30
31, 41	103(a)	Yamaguchi	31, 41	
31, 41	103(a)	Yamaguchi, Hinckley[11]		
Overall Outcome			31, 41	15–18, 21, 22, 26, 30

XI. ORDER

In consideration of the foregoing, it is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has shown by a preponderance of the evidence that claims 31 and 41 of the '850 patent are unpatentable;

ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has not shown by a preponderance of the evidence that claims 15–18, 21, 22, 26, and 30 of the '850 patent are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude (Paper 28) is *denied*; and

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

[10] Because we determine that claims 31 and 41 challenged in this ground are unpatentable under § 103(a) over Yamaguchi, we decline to address these claims for this ground.

[11] Because we determine that claims 31 and 41 challenged in this ground are unpatentable under § 103(a) over Yamaguchi, we decline to address this ground.

IPR2021-01239
Patent 8,624,850 B2

For PETITIONER:

Ryan Yagura
Ben Haber
Nicholas Whilt
O'MELVENY & MYERS LLP
ryagura@omm.com
bhaber@omm.com
nwhilt@omm.com

For PATENT OWNER:

Stephen McBride
James Carmichael
CARMICHAEL IP, PLLC
stevemcbride@carmichaelip.com
jim@carmichaelip.com

James Murphy
Jason Wietjes
Adam Daniels
POLSINELLI PC
jpmurphy@polsinelli.com
jwietjes@polsinelli.com
adaniels@polsinelli.com

Trials@uspto.gov
571-272-7822

Paper 39
Entered: January 24, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

POWER2B, INC.,
Patent Owner.

IPR2021-01266
Patent 9,569,093 B2

Before BARBARA A. PARVIS, SHEILA F. McSHANE, and JOHN D. HAMANN, *Administrative Patent Judges.*

HAMANN, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining Some Challenged Claims Unpatentable
Denying Patent Owner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

In this *inter partes* review, instituted pursuant to 35 U.S.C. § 314, Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, "Petitioner") challenge the patentability of claims 1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, and 56–58 ("the challenged claims") of U.S. Patent No. 9,569,093 B2 (Ex. 1001, "the '093 patent"), owned by Power2B, Inc. ("Patent Owner"). We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is entered pursuant to 35 U.S.C. § 318(a) (2018) and 37 C.F.R. § 42.73 (2022).

For the reasons discussed herein, we determine that Petitioner by a preponderance of the evidence (i) shows that claims 1, 5, 8, and 11–13 are unpatentable, and (ii) does not show that claims 26, 29, 36–38, 44–46, 48, 49, and 56–58 are unpatentable.

A. Procedural History

Petitioner filed a Petition requesting *inter partes* review of the challenged claims of the '093 patent. Paper 3 ("Pet."). Patent Owner filed a Preliminary Response. Paper 8. With our authorization, Petitioner filed a Preliminary Reply to the Preliminary Response (Paper 10) relating to claim construction and discretionary denial under § 325(d), and Patent Owner filed a Preliminary Sur-reply in response to the Preliminary Reply (Paper 11).

We instituted *inter partes* review of all of the challenged claims of the '093 patent on all of the grounds raised in the Petition. Paper 12 ("Dec. on Inst."), 45. Patent Owner filed a Response to the Petition. Paper 17 ("PO Resp."). Petitioner filed a Reply to Patent Owner's Response. Paper 20 ("Pet. Reply"). Patent Owner filed a Sur-reply to Petitioner's Reply. Paper 25 ("PO Sur-reply").

Patent Owner filed a Motion to Exclude certain of Petitioner's evidence (Paper 32, "Mot." or "Motion") and Petitioner filed an Opposition (Paper 33, "Opp.").

An oral hearing was held on October 26, 2022. A transcript of the oral hearing is included in the record. Paper 38 ("Tr.).

B. Real Parties-in-Interest

The parties identify themselves as the real parties-in-interest. Pet. 2; Paper 7, 2.

C. Related Matters

The parties identify *Power2B, Inc. v. Samsung Electronics Co.*, Case No. 6:20-cv-01183-ADA (W.D. Tex.) (the "parallel litigation") as a matter that may affect, or be affected by, a decision in this proceeding. Pet. 2; Paper 7, 2. In addition, Petitioner has filed petitions for *inter partes* review of four additional patents that also are owned by Patent Owner: (i) U.S. Patent No. 10,156,931 B2 (IPR2021-01190); (ii) U.S. Patent No. 8,610,675 B2 (IPR2021-01220); (iii) U.S. Patent No. 8,624,850 B2[1] (IPR2021-01239); and (4) U.S. Patent No. 9,317,170 B2 (IPR2021-01257).

D. The Challenged Patent

The '093 patent "relates to displays, information input devices[,] and user interface functionalities." Ex. 1001, 1:36–37. More specifically, the '093 patent "seeks to provide an integrated display and input device, [with] improved user interfaces and user interface functionalities." *Id.* at 1:55–57. Figure 23B, shown below, illustrates an embodiment of the '093 patent. *Id.* at 9:17–20.

[1] U.S. Patent No. 8,624,850 B2 ("the '850 patent") is the parent of the '093 patent. Ex. 1001, code (63).

FIG. 23B

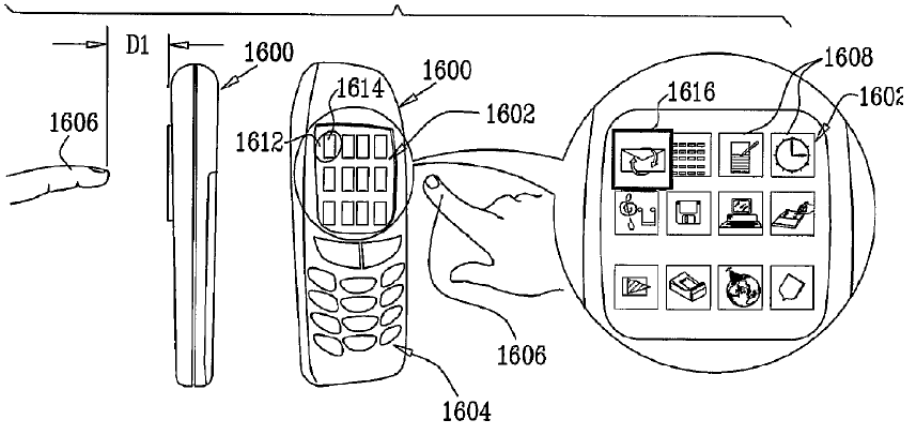

Figure 23B, above, is an "illustration[] of desktop user interface functionality of a mobile device constructed and operative in accordance with a preferred embodiment of the" '093 patent. *Id.* As illustrated, "the integrated display and input device is a mobile computer and/or communicator 1600," and "includes a display screen 1602 having touch responsive input functionality and/or propinquity responsive input functionality." *Id.* at 51:37–38, 51:54–56. The "display screen 1602 typically displays an array of application launch icons 1608." *Id.* at 52:2–4. In addition, "keyboard 1604 may be provided as part of the integrated display and input device." *Id.* at 51:61–64.

Figure 23B "shows finger 1606 located at a first distance Dl from display screen 1602, such that the propinquity responsive input functionality senses finger 1606 in propinquity to display screen 1602 which defines an impingement area 1612 of light reflected from finger 1606 that is generally centered on a first application launch icon 1614." *Id.* at 52:5–10. For some embodiments of the '093 patent, the integrated display and input device also includes at least one illuminator for illuminating the object when it has the predetermined degree of propinquity to the display, and may also provide backlighting. *Id.* at 2:3–9. The '093 patent discloses that "[t]he

functionality of the mobile device 1600 causes icon 1614 to appear in an enlarged or otherwise visually sensibly emphasized form, as indicated by reference numeral 1616." *Id.* at 52:11–14.

To enable propinquity functionality, the '093 patent discloses various embodiments, such as illustrated in Figure 4, shown below. *Id.* at 15:24–28.

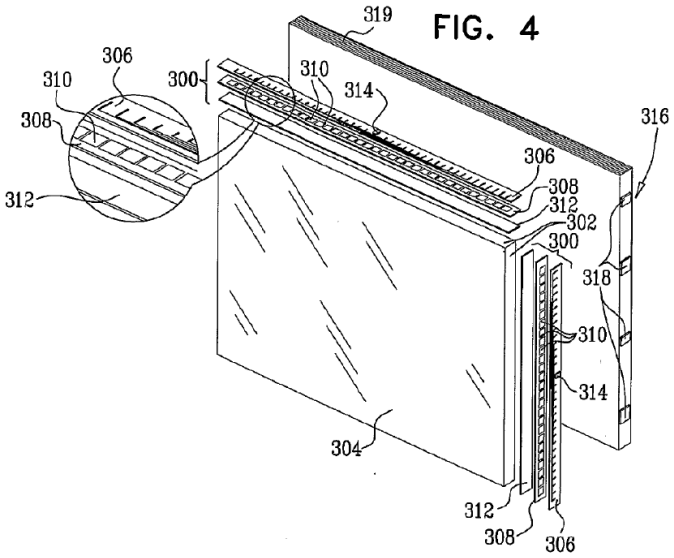

Figure 4, above, "is a simplified illustration of a portion of an input device" "employing detector elements arranged along edges of a display element," in accordance with an embodiment of the '093 patent. *Id.* As illustrated, Figure 4 shows "at least one detector assembly 300 is arranged along at least one edge 302 of a viewing plane defining plate 304 to sense light impinging on plate 304 and propagating within the plate 304 to the edges 302 thereof." *Id.* at 15:28–32. "Preferably, detector assemblies 300 are provided along at least two mutually perpendicular edges 302, as shown, though detector assemblies 300 may be provided along all or most of edges 302" or "may be provided along only one edge 302 of plate 304." *Id.* at 15:36–40. As illustrated, "the detector assembly 300 comprises a support substrate 306 onto which is mounted a linear arrangement 308 of detector elements 310."

Id. at 15:41–44. "Interposed between linear arrangement 308 and edge 302 is a cover layer 312," which may provide "physical protection, light intensity limitation, and field-of-view limitation." *Id.* at 15:44–45. The support substrate 306 may be mounted onto a display housing or onto an edge 302 of plate 304. *Id.* at 15:52–55. "A processor 314 for processing the outputs of the detector elements 310 may also be mounted on the support substrate 306." *Id.* at 15:60–62.

E. The Challenged Claims

Petitioner challenges claims 1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, and 56–58 of the '093 patent, of which claims 1 and 44 are independent. Claims 1 and 44 are illustrative, and read as follows:

> 1. An integrated display and input device, comprising:
> a pixel array operative to provide a visually sensible output;
> at least one sensor operative to sense a position of an object with respect to the pixel array when the object is within a predetermined degree of propinquity to the pixel array;
> at least one illuminator that provides backlighting and illuminates the object within the predetermined degree of propinquity; and
> circuitry that receives an output from the at least one sensor and provides a non-imagewise input representing the position of the object relative to the pixel array to utilization circuitry.

Ex. 1001, 67:45–58.

> 44. An integrated display and input device, comprising:
> a pixel array operative to provide a visually sensible output;
> a detector assembly arranged at an edge of a viewing plane defining plate, the detector assembly includes a support substrate and an arrangement of sensor elements, wherein at least one sensor element in the arrangement of sensor elements detects electromagnetic radiation at a baseline level and senses the

> position of the object with respect to the pixel array when the object is within a predetermined degree of propinquity to the pixel array; and
>
> circuitry that receives an output from the detector assembly and provides a non-imagewise input to utilization circuitry, the non-imagewise input represents the position of the object relative to the pixel array and corresponds to a location of the at least one sensor element in the arrangement when an amount of electromagnetic radiation or a change in the amount of electromagnetic radiation detected by the at least one sensor element exceeds a first predetermined threshold.

Id. at 69:67–70:20.

F. Instituted Grounds of Unpatentability

We instituted trial based on the following grounds of unpatentability, which are all the grounds of unpatentability raised in the Petition:

Claim(s) Challenged	35 U.S.C. §[2]	Reference(s)/Basis
1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, 56–58	103(a)	Reime[3]
1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, 56–58	103(a)	Reime, Hinckley[4]
48	103(a)	Reime, Hinckley, Eliasson[5]

Pet. 4, 19–64. Petitioner submits the Declaration of Benjamin B. Bederson (Ex. 1002) and the Reply Declaration of Benjamin B. Bederson (Ex. 1035)

[2] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. Because the '093 patent issued from an application having an effective filing date before March 16, 2013, we apply the pre-AIA version of the statutory basis for unpatentability.
[3] US 2003/0034439 A1, published Feb. 20, 2003 (Ex. 1010, "Reime").
[4] US 2002/0021278 A1, published Feb. 21, 2002 (Ex. 1011, "Hinckley").
[5] WO 2005/026938 A2, published Mar. 24, 2005 (Ex. 1015, "Eliasson").

in support of its arguments. Patent Owner submits the Declaration of Darran R. Cairns, Ph.D. (Ex. 2056) in support of its arguments.

II. LEVEL OF ORDINARY SKILL IN THE ART

To determine whether an invention would have been obvious at the time it was made, we consider the level of ordinary skill in the pertinent art at the time of the invention. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In assessing the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC, Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citing *Custom Accessories, Inc. v. Jeffrey-Allan Indus., Inc.*, 807 F.2d 955, 962–63 (Fed. Cir. 1986)). "[O]ne or more factors may predominate." *Id.*

In our Decision on Institution, we adopted the following definition for one having ordinary skill in the art at the time of the invention of the '093 patent: one who "would have had a bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and . . . two years of experience in the research, design, development, and/or testing of touch and/or proximity sensors, human-machine interaction and interfaces, and related firmware and software, or the equivalent, with additional education substituting for experience and vice versa." Dec. on Inst. 22 (quoting Pet. 10 (citing Ex. 1002 ¶ 47)). This definition mirrors what Petitioner proposed, except we excised the phrase "at least" which modified the years of experience as that language is vague and open-ended. *Id.*

Patent Owner proposes a different definition for one of ordinary skill in the art, but does not specifically address any deficiencies in Petitioner's

proposed definition. PO Resp. 9. Rather, Patent Owner states that Petitioner's obviousness arguments "are not affected [by] differences in the definitions." *Id.* (citing Ex. 2056 ¶ 10).

Because Petitioner's definition of the level of skill in the art (excluding "at least") is consistent with the '093 patent and the asserted prior art, we maintain it for purposes of this Final Written Decision. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *GPAC*, 57 F.3d at 1579; *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). Our analysis herein, however, does not turn on which of the parties' definitions we adopt.

III. CLAIM CONSTRUCTION

Because the Petition was filed after November 13, 2018, we apply the same claim construction standard that would be used in a civil action under 35 U.S.C. § 282(b), following the standard articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc). 37 C.F.R. § 42.100(b); 83 Fed. Reg. 51,340, 51,340–41, 51,343 (Oct. 11, 2018). In applying such standard, claim terms are generally given their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art, at the time of the invention and in the context of the entire patent disclosure. *Phillips*, 415 F.3d at 1312–13. "In determining the meaning of the disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips*, 415 F.3d at 1312–17).

The parties dispute how to construe (i) "a predetermined degree of propinquity" and (ii) "a detector assembly."[6] PO Resp. 10–31; Pet. Reply 1–13; PO Sur-reply 2–13. We address these two terms below.

A. Predetermined Degree of Propinquity

Patent Owner argues that we should construe "a predetermined degree of propinquity" to mean "a specified proximity distance established in advance and does not include touching." PO Resp. 11. In contrast, Petitioner argues that this term should be afforded its plain and ordinary meaning, which does not exclude touching. Pet. Reply 2. The parties agree, however, that "propinquity" is interchangeable with "proximity." Pet. Reply 3 n.4; PO Sur-reply 2; *see also* Ex. 1034, 2 (district court construing "propinquity" to mean "proximity"). We first address the "does not include touching" portion of Patent Owner's proposed construction, and then address the remaining portion.

1. Does Not Include Touching

Patent Owner argues that the language in challenged independent claims 1 and 44 "does not mention or reference any 'touching.'" PO Resp. 14. Petitioner responds that in the claims "within" immediately proceeds "a predetermined degree of propinquity," and in that context, "when the object is ***within*** that degree of proximity or more (i.e., is more proximate, up to and including touching) the pixel array senses the object." Pet. Reply 3; *see also, e.g.*, Ex. 1001, 67:48–51 (reciting "sens[ing] a position of an object

[6] The parties also dispute the meaning of "directly to," which appears in dependent claim 48. PO Resp. 31–34; Pet. Reply 13–17. However, we do not need to address the meaning of this term for purposes of this Decision, and thus, we do not.

with respect to the pixel array when the object is within a predetermined degree of propinquity to the pixel array").

Patent Owner argues that the '093 patent Specification supports that "propinquity" does not include touching. PO Resp. 16–18. In particular, Patent Owner argues that the '093 patent Specification repeatedly uses the term "propinquity" to describe and depict an object positioned at a distance from the device without touching. *Id.* at 16 (citing Ex. 1001, 49:45–48, 50:19–24, 52:5–8, 53:31–34, Figs. 18A, 20A, 21A, 22, 23A, 23B, 23C, 24A, 24B, 25A, 25B, 26A). For example, Patent Owner refers to the Specification's disclosure that "[i]n FIG. 20A, the user's fingers are located in propinquity to plate 1508, at a height H therefrom." *Id.* (quoting Ex. 1001, 49:45–48). "In contrast, the '093 patent [S]pecification uses the word 'touch' to describe an object in contact with the device," according to Patent Owner. *Id.* (citing Ex. 1001, 49:47–48, 50:22–24, 52:37–41, Figs. 20B, 21B, 23E, 24C, 26B, 26E, 27D, 28A, 29B).

Petitioner argues that the "[S]pecification consistently uses the phrase 'having at least a predetermined degree of propinquity' to cover both when the object is in proximity and when the object is 'touching' the pixel array." Pet. Reply 5. For example, Petitioner refers to the Specification's disclosure that in Figure 22 that one of the "user's fingers is located in propinquity to but not touching plate 1508 and one of the user's fingers is touching plate 1508." *Id.* (quoting Ex. 1001, 50:56–58).

We agree with Petitioner and conclude that Patent Owner incorrectly attempts to exclude touching from the claims. Patent Owner incorrectly focuses on the term "propinquity" itself and ignores the surrounding claim language. That is, whether propinquity and touching are mutually exclusive, as Patent Owner argues, is inapposite. The claims do not recite having a

particular propinquity. Rather, they recite "is *within* a predetermined degree of propinquity," without reciting a lower bound. *E.g.*, Ex. 1001, 67:48–51 (emphasis added). The plain meaning thus includes a degree of propinquity, and being closer.

The Specification supports this conclusion by disclosing detecting a user's fingers when they touch, or are located in propinquity to, a surface. *See, e.g.*, *id.* at 48:48–52 ("[A] position of a user's fingers is detected by means of a touch responsive input functionality and/or propinquity responsive input functionality."), 49:49–52 ("When the user's fingers touch, as in FIG. 20B, or is located in propinquity to, as in FIG. 20A, plate 1508, the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."), 50:25–28 ("When the user's fingers touches, as in FIG. 21B, or is located in propinquity to, as in FIG. 21A, plate 1508, the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."), 50:58–61 ("When the user's fingers touch, or are located in propinquity to, plate 1508, the light reflected from the fingers is detected by one or more of detector elements 1504 . . . ."). In other words, the Specification discloses that the fingers are sensed when they are within the degree of propinquity, or are closer (e.g., touching). *Id.*

Patent Owner's reliance on the Specification to argue that "propinquity" is mutually exclusive from touching is inapposite. PO Resp. 16–18. Again, the claims recite—and the Specification discloses—sensing an object when it "is within" a degree of propinquity. Ex. 1001, 67:48–51, 70:10–11.

In addition, we find unavailing Patent Owner's reliance on certain dependent claims to support its arguments. *See* PO Resp. 14–15; PO Sur-reply 4–5. In particular, Patent Owner argues that dependent claims 10,

16, 75, and 81 demonstrate that the '093 patent "uses different language to describe 'touch' or is 'touching' interactions between an object and the device." PO Resp. 14. This argument is unavailing for the same reasons discussed above. Again, whether propinquity is mutually exclusive from touching is inapposite in the context of the claims.

Rather, we find that these dependent claims support our conclusion that having at least a predetermined degree of propinquity does not exclude touching. *See* Ex. 1001, 68:13–16, 68:35–38, 72:33–36, 72:55–58. For example, dependent claim 10 adds that "utilization circuitry provides functionality to distinguish at least between positions of the object when touching and not touching the device." *Id.* at 68:13–16. We find persuasive Petitioner's following argument, which concisely expresses the logical impact of dependent claim 10 on the proposed construction:

> Claim 1 requires a pixel array sensing an object within a predetermined degree of propinquity to the pixel array, while claim 10 requires circuitry sensing a distinction between when the object touches or does not touch the device. For claim 10's circuitry to sense a distinction between instances of touching and not touching, claim 1's pixel array cannot exclude touching without rendering claim 10 a nullity.

Pet. Reply 4 (citation omitted). In other words, if sensing a position of an object "when the object is within a predetermined degree of propinquity to the pixel array" excludes when the object touches the array, there is no "object when touching" position later to distinguish. *Compare* Ex. 1001, 67:48–51, *with id.* at 68:13–16. We find unavailing Patent Owner's argument in response that rather than a pixel array, the claims require a sensor or detector assembly do the sensing. PO Sur-reply 4–5. Simply put, Patent Owner avoids the point of Petitioner's argument (i.e., if claim 1

excludes touching, there would be no "object when touching" position later to distinguish).

Moreover, we find unavailing Patent Owner's arguments that there is no nullity concern because claims 1 and 10 recite different structures and operations that do not reference or exclude each other. PO Sur-reply 5. In particular, Patent Owner argues that the dependent "claims require additional utilization circuitry—not the 'at least one sensor'—to sense touching." *Id.* Contrary to Patent Owner's arguments, claim 10's utilization circuitry is further configured "to distinguish" between positions, rather than to sense touching. Ex. 1001, 68:13–16. Notably, claim 1 recites "circuitry that receives an output from the at least one sensor and provides a non-imagewise input representing the position of the object relative to the pixel array to the utilization circuitry." *Id.* at 67:55–58. In other words, the utilization circuitry is told about the sensed position of the object. *See id.* Nor do we find availing Patent Owner's arguments concerning claim differentiation. PO Resp. 14–15; PO Sur-reply 4–5. For the reasons we discuss above, we conclude that the dependent claims add limitations (e.g., utilization circuitry to distinguish between positions) to further narrow claim scope rather than to introduce touching, as Patent Owner argues.

In addition, we have reviewed the testimony of the parties' experts that Patent Owner cites, but we give it little, if any, weight in light of the clear disclosure of the intrinsic evidence. *See Wi-LAN, Inc. v. Apple Inc.*, 811 F.3d 455, 462 (Fed. Cir. 2016) (finding extrinsic evidence "is generally of less significance than the intrinsic record" in matters of claim construction); *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (finding that when "an analysis of the intrinsic evidence

alone will resolve any ambiguity in a disputed claim term[,] . . . it is improper to rely on extrinsic evidence").

Lastly, our conclusion to not include "and does not include touching" is consistent with the plain and ordinary meaning of the claim language in light of the intrinsic evidence. As such, our conclusion also is consistent with the district court's construction (i.e., "[p]ropinquity means 'proximity,' and plain and ordinary meaning for the remaining language"). Ex. 1034, 2. In addition, we note that the parties have not provided any analysis from the district court underlying its constructions which would support a different conclusion.

In sum, we conclude that the construction for this term should not include Patent Owner's proposed "and does not include touching."

2. Specified Proximity Distance Established in Advance

Patent Owner's proposed construction replaces "a predetermined degree of propinquity" with "a specified proximity distance established in advance." PO Resp. 11. Petitioner argues that this term should be afforded its plain and ordinary meaning. Pet. Reply 2.

Patent Owner argues that "the '093 patent [S]pecification makes clear the term 'predetermined degree' requires a specified distance established in advance." PO Resp. 17. Patent Owner adds that the '093 patent discloses "performing certain operations based on an object being at pre-established and specific distances." *Id.* at 17–18 (citing Ex. 1001, 50:19–51, 52:31–41, 56:64–57:20). For example, the '093 patent discloses performing one action "when a finger is sensed at a first specific distance D1 from a screen, and a second action . . . when the finger is sensed at a second specific distance D2 from the screen," according to Patent Owner. *Id.* at 18 (citing Ex. 1001, 56:64–57:20).

We have reviewed the arguments and supporting evidence, as well as the claim language and the '093 patent Specification. We parse through Patent Owner's proposed construction below.

First, Patent Owner's proposed construction replaces "a . . . degree of propinquity" with "a specified proximity distance." PO Resp. 11. Accounting for the interchangeability of propinquity and proximity, Patent Owner in effect argues that *a degree of* means *a specified distance*. *Id.* The '093 patent Specification, however, does not support making this change. For example, the Specification's teachings as to propinquity focus on sensing an object's position when "the amount of light measured or the change in the amount of light measured exceeds a predetermined threshold." *See, e.g.*, Ex. 1001, 50:5–10. In other words, the Specification teaches that "[t]ypically, the location of at least one detector element . . . , in which the amount of light measured or the change in the amount of light measured exceeds a predetermined threshold, corresponds to the location of the user's finger . . . ." *Id.* at 45:11–16. Thus, rather than making a specific distance calculation, the '093 patent Specification teaches measuring light to detect when it exceeds a predetermined threshold. *See, e.g.*, *id.* at 45:11–16, 50:5–10. Of course, as the '093 patent recognizes, there will be some resultant distance that corresponds to the predetermined threshold, but that distance is not measured and it does not mean that the '093 patent Specification teaches that such a distance is specified. *See, e.g.*, *id.* at 52:5–8 ("FIG. 23B shows finger 1606 located at a first distance D1 from display screen 1602, such that *the propinquity responsive input functionality senses* finger 1606 in propinquity to display screen 1602") (emphasis added). Rather, such a distance is an artifact of the predetermined threshold, and the range of closer distances also are included. *Id.*

Second, Patent Owner's construction replaces "predetermined" with "established in advance." PO Resp. 11. Patent Owner, however, does not explain how these terms differ, if at all. *Id.* at 17–18. Nor does Patent Owner explain how replacing "predetermined" with "established in advance" relates to the arguments about unpatentability in this case. *Id.* We conclude that "predetermined" has a clear plain and ordinary meaning, and does not require an express construction.

In sum, we find no principled basis to replace "a predetermined degree of propinquity" with "a specified proximity distance established in advance."

3. Summary

We conclude for "a predetermined degree of propinquity" that (i) "propinquity" means "proximity," (ii) its remaining language should be afforded its plain and ordinary meaning, and (iii) touching is not excluded.

B. Detector Assembly

Patent Owner argues that "detector assembly" "requires a distinct structure 'having an array of two or more detector elements that detect electromagnetic radiation.'" PO Resp. 19–31; PO Sur-reply 8–13. Petitioner argues that this term should be afforded its plain and ordinary meaning. Pet. Reply 7–13. We first address the specific language of Patent Owner's proposed construction, and then address Patent Owner's arguments about a distinct structure.

1. Having an Array of Two or More Detector Elements

Patent Owner argues that "detector assembly" means "having an array of two or more detector elements that detect electromagnetic radiation." PO Resp. 11. According to Patent Owner, the plain claim language requires an "assembly," which is structure. PO Resp. 23. Patent Owner adds that the

'093 patent Specification confirms that the claimed detector assembly has an array of two or more detector elements that detect electromagnetic radiation. *Id.* at 24 (citation omitted). For example, "[t]he '093 patent [S]pecification illustrates an exemplary 'detector assembly' in Fig. 17A," and "corresponding hardware components, including a 'detector *array* 1102,' 'a support substrate 1104,' and 'a cover layer 1106,'" according to Patent Owner. *Id.* at 25 (citing Ex. 1001, 37:6–61); *see also id.* at 26 (citing Ex. 1001, 4:10–15, 39:24–26, 39:36–42, 46:62–64) (arguing that the Specification discloses having two arrays for a detector assembly). In addition, Patent Owner argues that "the '093 patent [S]pecification distinguishes between interfaces that have 'detector assembly' hardware from other hardware configurations that include individual 'interspersed' detectors/emitters within a display." *Id.* at 27 (citing Ex. 1001, 11:29–34, 12:34–36, 13:17–19, Figs. 1C, 2A, 2B).

Having reviewed the arguments, we now parse through Patent Owner's proposed construction. First, we disagree with Patent Owner that a detector assembly requires having "an array." Nothing in the claim language of claims 26 and 44 requires that the detector assembly comprise an array. *See* Ex. 1001, 69:1–4, 69:67–70:20. Moreover, Patent Owner does not explain clearly the meaning it ascribes to "array," which thus adds ambiguity rather than providing clarity as to the scope of the claims. For example, the Specification discloses that for many embodiments that a single detector assembly may be provided along only one edge. *E.g.*, Ex. 1001, 15:39–40. Accordingly, many embodiments in the Specification would be inconsistent with a multi-dimensional array requirement.

In addition, the '093 patent Specification discloses that a detector assembly can comprise "a linear arrangement of detector elements." *E.g.*,

id. at 15:41–44, 33:30–4. It also discloses that a detector assembly can comprise "a plurality of discrete single-element detector elements." *Id.* at 37:46–48. Thus, the '093 patent Specification discloses arrangements other than an array for detector elements.

In addition, claim 29, which depends from claim 26, recites that the detector assembly comprises, *inter alia*, "an arrangement of detector elements." *Id.* at 69:11–13. And claims 36–38, which each depends from claim 29, recites the following, respectively: "the arrangement of detector elements comprises" (i) "a plurality of discrete single-element detectors," (ii) "an integrally formed multi-element detector array," and (iii) "a plurality of discrete multi-element detectors." *Id.* at 69:32–40. Thus, two of the recited arrangements for a detector assembly are not arrays. *Id.*; *see also Samsung Elecs. Co. v. Power 2B Inc.*, IPR2021-01239, Paper 40 at 75:14–23 (PTAB Nov. 15, 2022) (transcript) (Patent Owner agreeing that "an array" can be struck from its proposed construction); Tr. 5:7–6:25 (Patent Owner agreeing to cross-designate the transcript from IPR2021-01239 for use in this case).

Second, we agree with Patent Owner that "detector assembly" requires "two or more detector elements." We find that this language is consistent with the plain and ordinary meaning for detector assembly in light of the '093 patent Specification. In particular, the '093 patent Specification repeatedly refers to a detector assembly as comprising multiple detector elements. *E.g.*, Ex. 1001, 3:13–14 ("[T]he detector assembly includes a support substrate and an arrangement of detector elements."), 15:40–43 (disclosing that the detector assembly comprises a linear arrangement of detector elements), 16:37–40 (same), 17:44–47 (same), 18:58–61 (same), 19:55–58 (same), 21:52–55 (same), 23:49–53 (same), 25:50–53 (same),

25:53–56 ("[T]he detector assembly 700 and the detector elements 710 are generally forward facing."), 27:55–59, 29:43–44, 31:39–43, 33:30–34, 35:19–20, 37:17–20, 37:41–43 ("[T]he detector assembly . . . includes an integrally formed multi-element detector array."), 37:46–48 ("[T]he detector assembly . . . includes a plurality of discrete single-element detector elements."), 37:55–57 ("[T]he detector assembly . . . includes a plurality of discrete multi-element detector elements."); *see also id.* at 2:66–67 (disclosing a "sensor includes a plurality of detector elements"), 3:37–39 (disclosing a "sensor includes a plurality of generally forward-facing detectors"). Notably, the '093 patent Specification does not disclose a detector assembly having only a single detector element. In addition, as we discuss above, dependent claims 36–38 recite having a plurality of detector elements. *Id.* at 69:32–40.

In light of the above, we are not persuaded by Petitioner's argument that "the claims are indifferent to whether . . . the detector assembly includes a single detector element or multiple detector elements." Pet. Reply 9 (citing Ex. 1035 ¶ 23). Petitioner provides no support from the intrinsic evidence for this argument. *Id.* Moreover, Dr. Bederson's cited testimony is conclusory and he provides no underlying factual support or reasoning for this testimony. *See* Ex. 1035 ¶ 23.

Third, the parties do not dispute that detector elements detect electromagnetic radiation. *See* PO Resp. 19–31; Pet. Reply 7–13. Moreover, that detector elements detect electromagnetic radiation is consistent with the '093 patent's Specification. *See, e.g.*, Ex. 1001, 4:53–64 (disclosing that detector elements detect electromagnetic radiation). Thus, consistent with its plain and ordinary meaning, we conclude that detector elements detect electromagnetic radiation.

In sum, we conclude that detector assembly means "two or more detector elements that detect electromagnetic radiation," which is consistent with its plain and ordinary meaning in light of the claim language and the '093 patent Specification.

2. Distinct Structure

Patent Owner argues, in the context of claim 44, that a detector assembly is a distinct and separate hardware structure from a pixel array. PO Resp. 23; PO Sur-reply 9. More specifically, Patent Owner argues that because a pixel array and a detector assembly are separately listed elements, they should be construed as distinct components. PO Sur-reply 9 (citing *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254–55 (Fed. Cir. 2010)).

In addition, Patent Owner argues that claim 44's specific positional requirement for the detector assembly (i.e., "arranged at an edge of a viewing plane defining plate") further evidences that the detector assembly is a distinct and separate hardware structure from a pixel array. PO Resp. 23 (citations omitted). Patent Owner adds that one of ordinary skill in the art "would have also understood that the 'assembly', by itself, requires a hardware relationship that connects its components to form a distinct structure." *Id.* (citing Ex. 1001, 69:1–13, 69:67–70:20; Ex. 2056 ¶ 44).

In addition, Patent Owner argues that the prosecution history of the '850 patent (parent of the '093 patent) "confirms the claimed 'detector assembly' is a distinct hardware structure." PO Resp. 28. More specifically, Patent Owner argues that the prosecution history evidences "that the claimed 'detector assembly' structure included something different and distinguishable over [the prior art's] waveguide and individual transmitter/receiver components." *Id.* at 30; *see also id.* at 29 (citing

Ex. 2037 (file history of the '850 patent), 835) (arguing that "the claimed 'detector assembly' distinguishable and allowable over the prior art"); Ex. 2037, 835 ("Regarding claim 134, the prior art does not teach 'the at least one sensor comprises a detector assembly arranged at least one edge of a viewing plane defining plate.'").

In addition, Patent Owner argues that the claimed detector assembly cannot be interspersed in the pixel array (or within a display). *See* PO Resp. 24–25, 27. More specifically, Patent Owner argues that the '093 patent Specification consistently distinguishes between (i) having detector elements interspersed among pixels, and (ii) a detector assembly arranged at edges of the plate. *Id.* at 24–25 (citations omitted). Patent Owner adds that the claimed detector assembly cannot be integrated with the pixel array "because the claimed 'detector assembly' cannot be 'arranged' at an 'edge' of itself." PO Sur-reply 9 (citing *Becton*, 616 F.3d at 1254; PO Resp. 23–24).

Petitioner argues that the plain and ordinary meaning of detector assembly does not require a physically separate hardware structure. Pet. Reply 7–8. Such a requirement is found nowhere in the claims, according to Petitioner. *Id.* at 9. Rather, Petitioner argues that the claims only recite "a detector assembly arranged at least one edge of a viewing plane defining plate." *Id.* (quoting Ex. 1001, 69:1–4, 70:3–4). Petitioner adds that the '093 patent Specification discloses that "the phrase 'at an edge' ***is to be interpreted broadly***." *Id.* (citing Ex. 1001, 44:7–13). In addition, Petitioner argues that unlike *Becton*, which recited elements "connected to" each other, "[t]he claim terms here do not require separate structures to make sense." *Id.* at 8 (citing *Becton*, 616 F.3d 1255–56).

Having reviewed the parties' arguments, we agree with Petitioner and conclude that the claims do not require a detector assembly to be physically separate from (i.e., not interspersed with) a pixel array. *See, e.g.*, Ex. 1001, 67:45–58, 69:1–4, 69:67–70:20. This is not to say that a detector assembly (e.g., detector elements) and the pixels of a pixel array are not distinct components, because they are in that they are separate components and perform different functions. *See, e.g.*, *id.* at 4:53–64 (disclosing that detector elements detect electromagnetic radiation), 10:1–2 (disclosing display devices including a pixel array operative to provide a visually sensible output), 37:46–51 (disclosing discrete single-element detector elements that are commercially available). Rather, the gravamen of the parties' dispute is whether claims 26 and 44 cover embodiments of the '093 patent where detector elements are interspersed (at least along an edge) with pixels in a pixel array. Nothing in the claim language or Specification precludes these claims from covering those embodiments. *Id.*

In addition, claims 26 and 44 recite the location of a detector assembly as being "arranged at least one edge of a viewing plane defining plate." *Id.* at 69:1–4, 70:3–4. The '093 patent broadly views what it means to be "at an edge," by including being behind, about, or along an edge within its scope. *E.g.*, Ex. 1001, 44:7–13. Moreover, the '093 patent illustrates that detector elements can be located, *inter alia*, along and behind an edge while being interspersed in a pixel array. *See id.* at Fig. 18F (showing detector elements 1322 along and behind an edge of plate 1328); *cf. In re Aslanian*, 590 F.2d 911, 914 (CCPA 1979) (considering drawings for what they reasonably disclose to one of ordinary skill in the art).

We find unavailing Patent Owner's reliance on *Becton*. First, unlike in *Becton* where the same structure was relied upon, detector elements and a

pixel array are separate components that perform separate functions. *Becton*, 616 F.3d at 1255 (accused infringer asserting "that the spring means and the hinged arm can be the same structure"); Ex. 1001, 4:53–64, 10:1–2, 37:46–51. Second, in *Becton*, the claims required one claim element to be "connected to" another claim element, which would be nonsensical if they were the same structure. *See Becton*, 616 F.3d at 1255. Here, claim 15 recites a location of a detector assembly (i.e., "arranged at an edge of a viewing plane defining plate"), which is compatible with the detector assembly being interspersed in a pixel array. *See, e.g.*, Ex. 1001, Fig. 18F.

We also find unavailing Patent Owner's argument that the term "'assembly', by itself, requires a hardware relationship that connects its components to form a distinct structure." PO Resp. 23. At its simplest, a detector assembly comprises a plurality of detector elements. *See, e.g.*, Ex. 1001, 29:45–54 (disclosing a detector assembly not having a support substrate or cover layer), 37:46–51 (disclosing a detector assembly "includes a plurality of discrete single-element detector elements"). We conclude that the '093 patent Specification does not impart a structure inherent in the word "assembly," beyond having a plurality of detector elements. *Id.*

We also find unavailing Patent Owner's arguments that the prosecution history of the '850 patent confirms that a detector assembly is a distinct hardware structure. PO Resp. 28–29. Simply put, Patent Owner overreads the Examiner's statement that the prior art does not teach "the at least one sensor comprises a detector assembly arranged at least one edge of a viewing plane defining plate." Ex. 2037, 835. The Examiner did not expressly state the reasons why the art failed to teach the allowed claim. *Id.* What aspect of the limitation the Examiner found was not taught remains unclear. Notably, "because the prosecution history represents an ongoing

negotiation between the PTO and the applicant, rather than the final product of that negotiation, it often lacks the clarity of the specification and thus is less useful for claim construction purposes." *Phillips*, 415 F.3d at 1315.

In addition, we have reviewed the testimony of the parties' experts on this issue, but we give it little, if any, weight in light of the clear disclosure of the claim language and Specification, which we discuss above. *See Wi-LAN*, 811 F.3d at 462.

IV. PRINCIPLES OF LAW

A 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 of the invention to a person having ordinary skill in the art. *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) objective evidence of non-obviousness, if present.[7] *See Graham*, 383 U.S. at 17–18. When evaluating a claim for obviousness, we also must "determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR*, 550 U.S. at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

V. ALLEGED OBVIOUSNESS OVER REIME

Petitioner argues that Reime renders claims 1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, and 56–58 of the '093 patent obvious. Pet. 4, 19–61. We

[7] Patent Owner does not present arguments or evidence of such objective evidence of non-obviousness. *See generally* PO Resp.

have reviewed the parties' arguments and the evidence of record. For the reasons that follow, we determine that Petitioner by a preponderance of the evidence (i) shows that Reime renders claims 1, 5, 8, 12, and 13 obvious; and (ii) does not show that Reime renders claims 11, 26, 29, 36–38, 44–46, 48, 49, and 56–58 obvious.

A. Summary of Reime

Reime relates to a touch sensitive device in an electronic device or a wireless telecommunication terminal. Ex. 1010 ¶ 2. Figure 2A, reproduced below, shows touch pad device 1.

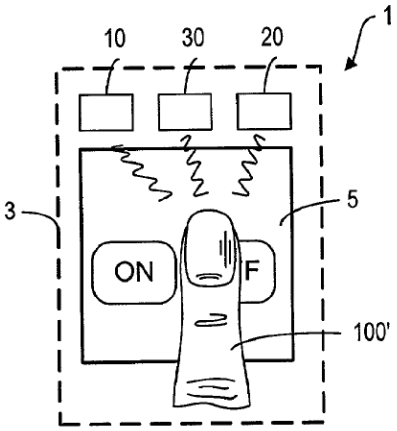

FIG. 2A

Figure 2A is a diagrammatic representation showing touch pad device 1 having optical sensor components 10, 20, and 30 placed near the top side of touch pad area 5. *Id.* ¶¶ 29, 76. As shown in Figure 2A, touch pad device 1 can be used to select the "ON" function or "OFF" function depending on the location of the "touching" point on touch pad area 5. *Id.* ¶ 75. When user's finger 100' touches or approaches the pad area 5, the changes in the output signal of the receiver 30 show which function is selected. *Id.*

B. Challenged Claim 1

1. An Integrated Display and Input Device (Preamble)

Petitioner argues that Reime teaches "[a]n integrated display and input device," as recited in the preamble of claim 1. Pet. 20–22. More specifically, Petitioner argues that Reime "relates generally to a touch sensitive device in an electronic device or a wireless telecommunication terminal." *Id.* at 20 (quoting Ex. 1010 ¶ 2). Petitioner argues Reime's "'touch pad device' . . . 'has a designated interaction area for allowing a user to use the object to interact with the touch pad device for inputting one or more functions in an electronic device.'" *Id.* at 20–21 (quoting Ex. 1010, code (57)). According to Petitioner, Reime teaches "that the display and input device are integrated," and more particularly teaches that "[i]n a mobile device or other electronic device, the touch pad area 5 can be a display panel such as a liquid crystal display (LCD) 92 mounted on a printed circuit board (PCB) or a printed wire board (PWB) 90." *Id.* at 21 (quoting Ex. 1010 ¶ 86); *see also id.* (citing Ex. 1010, Figs. 2A–D) (arguing that Reime's electronic device includes an integrated display and input).

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Reime teaches claim 1's preamble.

2. Pixel Array

Petitioner argues that Reime teaches "a pixel array operative to provide a visually sensible output," as recited in claim 1. Pet. 22–23. More specifically, Petitioner argues that Reime teaches that "the touch pad area 5 can be a display panel such as a liquid crystal display (LCD)." *Id.* at 22 (quoting Ex. 1010 ¶ 86). According to Petitioner, one of ordinary skill in the

art, "would have understood that an LCD is made up of an array of pixels." *Id.* (citing Ex. 1002 ¶ 71). Petitioner adds that "Reime's pixel array is operative to provide a visually sensible output." *Id.* In particular, Reime teaches that the "touch pad area 5 can be used as a display to provide messages to the user or to indicate the functionality of the touch pad device 1," according to Petitioner. *Id.* at 22–23 (quoting Ex. 1010 ¶ 87); *see also id.* at 23 (citing Ex. 1010, Figs. 2A–2D) (arguing that Reime depicts visually sensible outputs on the display).

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Reime teaches "a pixel array operative to provide a visually sensible output."

3. At Least One Sensor Operative to Sense a Position

a) Petitioner's Arguments

Petitioner argues that Reime teaches "at least one sensor operative to sense a position of an object with respect to the pixel array when the object is within a predetermined degree of propinquity to the pixel array," as recited in claim 1. Pet. 24–26. Petitioner first focuses on the first part of this limitation (i.e., "at least one sensor operative to sense a position of an object with respect to the pixel array"). Petitioner argues that "Reime describes the invention's 'general principle,' 'where a group of two light emitters and a light receiver is used to detect the presence of a nearby object.'" *Id.* at 24 (quoting Ex. 1010 ¶ 28). According to Petitioner, "[t]his is shown, for example, in Reime's F[igure] 2A, . . . where the position of finger 100' is sensed with respect to 'receiver 30.'" *Id.* (citing Ex. 1010, Fig. 2A, ¶ 74). Petitioner argues that Reime teaches that "'[w]hen a user uses an object such as a pencil 100 or a finger 100' . . . to touch the touch

pad 5,' light from emitters 10, 20 'encounters the surface of the object 100,' and a portion of that light 'reflects off the object 100 and is received by the receiver 30.'" *Id.* (quoting Ex. 1010 ¶ 73).

Moreover, Petitioner argues that "in addition to detecting the position of the object with respect to a detector, Reime makes clear that, by using multiple detectors and/or measurements, the object's position with respect to the display can also be determined." *Id.* at 25. In particular, Reime teaches "that one series of eight measurement cycles can be used to determine the-two dimensional coordinates of the touching point *with respect to the touch pad area 5*," according to Petitioner. *Id.* (quoting Ex. 1010 ¶ 80). And Petitioner argues that "'touch pad area 5' contains the LCD display pixels." *Id.* (citing Ex. 1010 ¶ 86). Petitioner argues that Reime thus teaches "sensing the position of the object relative to the display pixels as claimed." *Id.* at 26 (citing Ex. 1002 ¶ 75).

As to the latter part of the limitation, Petitioner argues that Reime teaches that the sensor senses the claimed position "when the object has a predetermined degree of propinquity to the pixel array." *Id.* at 26. More specifically, Petitioner argues that "Reime teaches measuring the 'amount of light received by the receiver 30 . . . from the output signal 130' and determining 'the presence of the object 100 near the emitters 10, 20 and the receiver 30' based on 'a change in the output signal 130.'" *Id.* (quoting Ex. 1010 ¶ 73). According to Petitioner, Reime teaches that it "is not necessary for the object 100' to physically touch or press the area 5 at a touching point." *Id.* (quoting Ex. 1010 ¶ 74). Petitioner argues that one of ordinary skill in the art "would have understood that determining the presence of the object when it is near, but not touching, the pixel array detects its location within a predetermined degree of propinquity." *Id.*

(citing Ex. 1002 ¶ 77). Petitioner adds that "[t]he level of nearness that triggers a response would be predetermined so that the device can distinguish nearby objects from those that are far away." *Id.*

b) Patent Owner's Arguments

Patent Owner disputes that Reime teaches this limitation. PO Resp. 48–50; PO Sur-reply 16–19. Patent Owner argues that "Reime teaches operations to determine the object's x-y coordinate or the 'horizontal location of the touching point' using a complex set of specific 'measurement cycles.'" PO Resp. 48–49 (citing Ex. 1010 ¶¶ 79–80). Patent Owner argues that "Reime further mentions 'detect[ing] the presence of a nearby object' in the context of determining the object's 'two-dimensional coordinates' (*e.g.*, x-y coordinates) corresponding to a 'touching point' in a 'touch area.'" *Id.* at 49 (quoting Ex. 1010 ¶¶ 28, 77, 79–81). "However, Reime generalizes the phrase 'touching the surface' to include 'making contact with the surface' or 'being adjacent to the surface' because the object's actual z-distance or 'specified proximity distance' is irrelevant to Reime's x-y measurements," according to Patent Owner. *Id.* (quoting Ex. 1010 ¶ 74). Patent Owner argues that "[t]hus, Reime fails to disclose and instead teaches away from sensing the position of the object when the object is within a 'predetermined degree of propinquity.'" *Id.* According to Patent Owner, one of ordinary skill in the art "would have understood that Reime's touch-detection operations do not concern or care about the object's actual proximity distance or 'predetermined degree of propinquity.'" *Id.* (citing Ex. 2056 ¶ 106). In other words, Patent Owner argues that "Reime does not relate to the object's specified proximity distance and does not distinguish between 'touching the surface,' 'making contact with the surface,' and

'being adjacent to the surface.'" PO Sur-reply 17 (quoting Ex. 1010 ¶ 74; citing Ex. 2056 ¶¶ 106–109).

In addition, Patent Owner argues that "Reime's hardware cannot be modified to determine or calculate the object's specified or 'predetermined degree' of proximity." PO Resp. 49; *see also id.* at 49–50 (arguing reasons why Reime cannot be modified to calculate a predetermined degree of propinquity) (citations omitted).

In addition, Patent Owner argues that Petitioner fails to show that Reime teaches performing the sensing function required by the claims, and instead Petitioner only argues that Reime teaches "sensing the position of an object using reflected light received by receiver 30," without referencing any hardware structure. PO Sur-reply 18 (citing Pet. 24–25, 46–49; Pet. Reply 18). According to Patent Owner, Petitioner instead relies on "Reime's other hardware components" (e.g., receiver signal processing 450 / microprocessor 460), which Petitioner equates to the claimed circuitry / utilization circuitry, for sensing the object's position. *Id.* (citing Pet. 25, 31–33, 42–43).

c) Our Analysis

We find that Petitioner shows by a preponderance of the evidence that Reime teaches a sensor that senses a position of an object with respect to a pixel array when the object is within a predetermined degree of propinquity to the pixel array. More specifically, we agree with Petitioner and find that Reime teaches that when a user uses an object such as a finger 100' to touch the touch pad 5, light from emitters 10, 20 encounters the surface of the object 100, and a portion of that light reflects off the finger 100' and is received by the receiver 30. Ex. 1010 ¶ 73, Fig. 2A; Pet. 24. In particular, Reime teaches that "the presence of the object 100 near the emitters 10, 20 and the receiver 30 would cause a change in the output signal 130," and that

the change attributable to the light from each emitter that is reflected off the object's surface can be separately measured. Ex. 1010 ¶ 73. Reime teaches "[w]hen such a change is detected," determining which emitter 10, 20 the object 100' is closer to, and by "a series of such measurements, it is possible to track the positions of the object 100." *Id.*

In addition, Reime explicitly states that "[i]t is not necessary for the object 100' to physically touch or press the area 5 at a touching point" because "the presence of the object 100' is detected by optical sensor components 10, 20 and 30." *Id.* ¶ 74. Put differently, Reime teaches that "touching the surface," regarding the touch pad device 1, "can be interpreted as 'making contact with the surface' *or 'being adjacent to the surface*.'" *Id.* (emphasis added).

We find unavailing Patent Owner's arguments that are tethered to "a predetermined degree of propinquity" excluding touching and requiring calculating the object's actual z-distance. *See* PO Resp. 48–50; PO Sur-reply 17. These arguments rely on portions of Patent Owner's proposed construction for this term, which we do not adopt. *See supra* Section III(A) (construing "a predetermined degree of propinquity").

For example, we find unavailing Patent Owner's argument concerning Reime not calculating an "actual z-distance." PO Resp. 49. Simply put, the plain language of this limitation does not require such a calculation. *See* Ex. 1001, 67:48–51; *see also supra* Section III(A)(2) (concluding that the '093 patent Specification teaches measuring light to detect when it exceeds a predetermined threshold, rather than making a specific distance calculation). Likewise, we find unavailing Patent Owner's argument that Reime's hardware cannot be modified to calculate the object's specified proximity.

PO Resp. 49. No such modification is required. Again, the claim language does not require making such a calculation.

Moreover, the plain and ordinary meaning of "position" is broad enough to cover both two-dimensional and three-dimensional positions, as evidenced by the '093 patent's Specification. *See, e.g.*, Ex. 1001, 6:24–27 (describing the position of an object as including a two-dimensional position or a three-dimensional position). Thus, calculating a specific z position (i.e., the third dimension) is not required by the limitation. And, we find that "when the object is within a predetermined degree of propinquity to the pixel array" covers Reime's teachings of determining the object's two-dimensional position when the object is detected via a change in the output signal 130. *See* Ex. 1010 ¶¶ 73–74.

Similarly, we find unavailing Patent Owner's arguments that Reime "does not distinguish between 'touching the surface,' 'making contact with the surface,' and 'being adjacent to the surface.'" PO Sur-reply 17. As we discuss above, the claim language recites "within a predetermined degree of propinquity," which includes being closer (e.g., touching). *See supra* Section III(A)(1) (concluding that touching is not excluded); Ex. 1001, 67:49–50, 70:9–11.

We also find unavailing Patent Owner's argument that Petitioner does not show that Reime teaches the sensing function, and does not reference any hardware structure. PO Sur-reply 18. Petitioner clearly identifies that Reime's receivers teach the claimed at least one sensor (e.g., receiver 30), and that Reime teaches that multiple detectors can be used to better detect the object's position. *See, e.g.*, Pet. 24–25; Pet. Reply 19. In particular, Reime teaches that "the presence of the object 100 near the emitters 10, 20 and the receiver 30 would cause a change in the output signal 130," and that

the change attributable to the light from each emitter that is reflected off the object's surface can be separately measured. Ex. 1010 ¶ 73. Reime teaches "[w]hen such a change is detected," determining which emitter 10, 20 the object 100' is closer to, and by "a series of such measurements, it is possible to track the positions of the object 100." *Id.*

Patent Owner incorrectly conflates a sensor being "operative to sense a position" with circuitry that receives input from a sensor and outputs position information. *See* Pet. Reply 18. Notably, claim 1 recites these elements separately. Ex. 1001, 67:45–58 (reciting claim 1). Reime's teaching of receiver 30 causing a change in the output signal 130 based on the presence of the object near the emitters teaches that receiver 30 is operative to sense a position. *E.g.*, Ex. 1010 ¶ 73. This is consistent with the '093 patent's disclosure that a sensor senses light reflected from an object and comprises a plurality of detector elements (e.g., photodiodes). *E.g.*, Ex. 1001, 2:15–16, 2:66–67; *see also id.* at 10:54–58.

In sum, we determine that Petitioner demonstrates by a preponderance of the evidence that Reime teaches "at least one sensor operative to sense a position of an object with respect to the pixel array when the object is within a predetermined degree of propinquity to the pixel array."

4. At Least One Illuminator

a) Petitioner's Arguments

Petitioner argues that Reime teaches "at least one illuminator that provides backlighting and illuminates the object within the predetermined degree of propinquity," as recited in claim 1. Pet. 30–31. First, Petitioner argues that one of ordinary skill in the art "would have understood that an LCD, such as the LCD 92 that makes up Reime touch pad area 5, . . . includes a backlight." *Id.* at 30 (citing Ex. 1002 ¶¶ 42–43, 83; Ex. 1010

¶ 86). Petitioner argues that "[a] backlight includes at least one illuminator and provides backlighting of the LCD pixels." *Id.* (citing Ex. 1002 ¶ 83). According to Petitioner, that one of ordinary skill in the art "would have understood that an LCD includes a backlight is further evidenced by . . . Gettemy[8] . . . , which discloses '[t]ouch screens typically include three layers: a touch panel layer, a display layer below the touch panel layer, and a backlight layer below the display layer.'" *Id.* (quoting Ex. 1005 ¶ 4; citing Ex. 1002 ¶ 84; Ex. 1005, Fig. 2).

Second, Petitioner argues that one of ordinary skill in the art "would further have understood that the backlight of Reime's LCD 92 would also illuminate the object when it is within the predetermined propinquity." *Id.* (citing Ex. 1002 ¶ 85). More specifically, Petitioner argues that Reime teaches that "'[w]hen a user uses an object such as a pencil 100 or a finger 100' (F[igure] 2A) to touch the touch pad 5,' light emitted from touch pad area 5 (including light from emitters 10, 20) 'encounters the surface of the object 100.'" *Id.* at 30–31 (quoting Ex. 1010 ¶ 73); *see also* Pet. Reply 22 (citing Ex. 1002 ¶ 85). "Reime's sensors detect reflections caused by ambient light illuminating the object," and "[o]ne of the sources of this ambient light would have been the LCD and its backlight," according to Petitioner. Pet. Reply 22 (citing Ex. 1010 ¶¶ 11, 17, 24, 73, 86, 88; Fig. 10A). Petitioner argues that one of ordinary skill in the art "would have thus understood that the LCD backlight both provides backlighting and also illuminates the nearby object." *Id.* (citing Ex. 1035 ¶ 48).

[8] US 2003/0156100 A1, published Aug. 21, 2003 (Ex. 1005, "Gettemy").

b) Patent Owner's Arguments

Patent Owner disputes that Reime teaches this limitation. PO Resp. 61–64. More specifically, Patent Owner argues that "Reime does not mention any backlighting element or using a backlighting element to illuminate an object within a specified distance or predetermined degree of propinquity." *Id.* at 61 (citing Ex. 2056 ¶ 137).

In addition, Patent Owner argues that "Gettemy discloses conventional 'touch screens' and describes 3 touch screen layers, including a touch panel layer, a display layer, and a backlight layer." *Id.* at 61–62 (citing Ex. 1005 ¶ 4). Patent Owner argues that "Gettemy further teaches the advantages for reducing the overall size and weight of mobile devices and proposes to eliminate the conventional 'touch panel' by integrating photosensor pixels and display pixels into a single display layer." *Id.* at 62 (citing Ex. 1005 ¶¶ 7, 37, Fig. 2; Ex. 2056 ¶ 138).

Patent Owner argues that in contrast "Reime's LCD is not a touch screen and Dr. Bederson does not explain how Gettemy's disclosures relating to conventional touch screens and/or Gettemy's integrated display/photo-optical display relates to Reime's LCD." *Id.* (citing Ex. 1002 ¶¶ 84–85). Patent Owner adds that Gettemy "expressly teaches away from adding components such as Reime's 'light guide' over the LCD," and that one of ordinary skill in the art "would not have looked to Gettemy for any disclosures relating to Reime's LCD because Gettemy expressly teaches away from Reime's light guide." *Id.* (citing Ex. 1005 ¶¶ 1–8; Ex. 2056 ¶ 139).

In addition, Patent Owner argues that Reime "teaches away from using any alleged 'backlighting element' to illuminate the object within a 'predetermined degree of propinquity.'" *Id.* (citing Ex. 2056 ¶ 140). More

specifically, Patent Owner argues that "Reime teaches 'pulsed mode' mode operations to operate its emitters at specific frequencies, and Reime further provides a 'high pass filter' to filter and detect only light transmitted by its emitters." *Id.* at 62–63 (citing Ex. 1010 ¶¶ 88–89). Patent Owner argues that one of ordinary skill in the art "would have understood that any additional light emitted by a 'backlight' would interfere with the light transmitted by Reime's emitters." *Id.* at 63 (citing Ex. 2056 ¶ 140). "Thus, even assuming Reime's LCD has a backlight, [one of ordinary skill in the art] would have understood that Reime would only filter out the corresponding backlight emissions." *Id.* Patent Owner adds that "it would[not] make any sense for [one of ordinary skill in the art] to modify any backlight in Reime to increase its light emission to transmit light upward and through the entire light guide and illuminate nearby objects only to have those same light emissions filtered out." *Id.*

In addition, Patent Owner argues that one of ordinary skill in the art "would have understood that Reime's light guide is designed to operate with infrared (IR) light that is guided perpendicular to any alleged 'backlight' layer to enable touch detection." *Id.* (citing Ex. 1010 ¶ 113). Thus, one of ordinary skill in the art "would have understood that the purpose of Reime's lightguide is to prevent light leakage or prevent light from escaping the top surface," according to Patent Owner. *Id.* (citing Ex. 2056 ¶¶ 128–130, 140–141).

c) Our Analysis

We find that Petitioner shows by a preponderance of the evidence that Reime teaches at least one illuminator that provides backlighting and illuminates the object within the predetermined degree of propinquity. More specifically, we agree with Petitioner and find that Reime teaches that the

LCD for Reime's touch pad includes a backlight, which includes at least one illuminator. *See* Ex. 1010 ¶ 86; Ex. 1002 ¶¶ 42–43, 83. We find persuasive Dr. Bederson's testimony on this issue as the testimony is consistent with what was known in the art (e.g., Gettemy's cited teachings) as of the invention of the '093 patent. Ex. 1002 ¶¶ 42–43, 83; Ex. 1005 ¶ 4, Fig. 2. We also agree with Petitioner and find that Reime teaches that when a user uses an object to touch the touch pad, light emitted from the touch pad area, including from the backlight of the LCD in the touch pad area, encounters and illuminates the surface of the object when it is within the predetermined propinquity. Ex. 1010 ¶¶ 73, 86; Ex. 1002 ¶ 85; Pet. 30–31. We also agree with Petitioner and find that Reime's sensors detect reflections caused by ambient light illuminating the object, which includes the LCD's backlight. *See, e.g.*, Ex. 1010 ¶¶ 11, 73, 86, 88; Ex. 1035 ¶ 48.

We find inapposite Patent Owner's arguments concerning Gettemy. PO Resp. 60–63. Petitioner relies on Gettemy solely to further evidence the knowledge that one of ordinary skill in the art would have had about Reime's disclosure of a LCD (i.e., that it would have had a backlight). *Id.* We appropriately consider such knowledge as part of our obviousness analysis. *See Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013). Thus, Patent Owner's arguments concerning Gettemy's other disclosures and Gettemy teaching away are not related to the issue of whether Reime teaches the claim limitation.

We also find inapposite Patent Owner's arguments concerning modifying Reime to include additional backlighting elements. PO Resp. 62–63. Petitioner's arguments are not based on modifying Reime, but rather on what Reime expressly teaches and what those teachings convey to one of ordinary skill in the art. *See* Pet. 30–31 (citing Ex. 1010 ¶¶ 73, 86; Ex. 1005

¶ 4, Fig. 2; Ex. 1002 ¶¶ 42–43, 83, 85). Reime already discloses a LCD, and as we find above, one of ordinary skill in the art would have understood that Reime's LCD includes a backlight, which includes at least one illuminator.

In addition, we find unavailing Patent Owner's argument that Reime teaches away from using a LCD's backlighting to illuminate the object. PO Resp. 62–63. Although we agree with Patent Owner that Reime teaches "a pulsed mode" for its emitters, Reime also expressly states that "[t]he emitters . . . *can be operated in a continuous mode* in that the output of the emitters does not contain a high frequency component, similar to the output of an incandescent lamp." Ex. 1010 ¶ 88 (emphasis added). Moreover, Reime describes that "[i]t is *preferable* that the[] emitters be operated in a pulsed mode," such as "[w]hen the output variation due to ambient light is *significant*." *Id.* (emphases added). Thus, we find that Reime at most expresses a preference for pulsed mode operation, especially when the ambient light is significant, but does not teach away from a continuous mode of operation, and hence ambient light. *See id.*; *Galderma Labs., L.P. v. Tolmar, Inc.*, 737 F.3d 731, 738 (Fed. Cir. 2013) ("A reference does not teach away . . . if it merely expresses a general preference for an alternative invention but does not criticize, discredit, or otherwise discourage investigation into the invention claimed.") (citation omitted).

We also find unavailing Patent Owner's argument concerning Reime's lightguide and preventing light from escaping the surface. PO Resp. 63. Reime teaches, for example, sensing a finger that is adjacent to the surface (without touching), as well as increasing the light received by a receiver when the approaching of the user's finger is detected by the reflection off the finger, and the surface is not touched. Ex. 1010 ¶¶ 74, 86. Hence, the light received by receiver is not limited to the light traveling

along the lightguide, but necessarily includes light reflected from above its surface. *Id.*

In sum, we determine that Petitioner demonstrates by a preponderance of the evidence that Reime teaches "at least one illuminator that provides backlighting and illuminates the object within the predetermined degree of propinquity."

5. Circuitry that Receives an Output

Petitioner argues that Reime teaches "circuitry that receives an output from the at least one sensor and provides a non-imagewise input representing the position of the object relative to the pixel array to utilization circuitry," as recited in claim 1. Pet. 30–32. To that end, Petitioner argues that Reime teaches "circuitry that receives an output from the sensor." *Id.* at 31. "As an example, F[igure] 14 includes signal processor 450," according to Petitioner. *Id.* (citing Ex. 1010 ¶ 106, Fig. 14). Petitioner argues that Reime teaches that "[t]he output signal 130 from the receiver 30 and the output signal 132 from the receiver 32 are conveyed to a signal-processing module 450." *Id.* (quoting Ex. 1010 ¶ 106).

In addition, Petitioner argues that Reime teaches that "[s]ignal processor 450 provides a non-imagewise input representing the position of the object relative to the pixel array to utilization circuitry." *Id.* at 32. "For example, Reime discloses that 'the signal processing module 450 sends measurement information 452 to the microprocessor 460,'" according to Petitioner. *Id.* (quoting Ex. 1010 ¶ 106). Petitioner adds that the measurement information signals are not images, but instead "are representations of the detected signal value, such as I_R shown in F[igure] 10B, or output signal 130 shown in F[igure] 1." *Id.* Petitioner argues that

Reime teaches that "this measurement information represents the position of the object relative to the pixel array contained in touch pad area 5." *Id.*

In addition, Petitioner argues that Reime teaches "that the measurement information 452 is provided to utilization circuitry, such as to a microprocessor or ASIC 460," as shown in Figure 14. *Id.* (citing Ex. 1010, Fig. 14). Petitioner argues that Reime's "[m]icroprocessor 460 'is connected to the components 400 to control the measurement on the touch pad device and make use of the measurement results therefrom.'" *Id.* (quoting Ex. 1010 ¶ 106).

After reviewing Petitioner's arguments and evidence, which are not addressed by Patent Owner (*see generally* PO Resp.), we determine that Petitioner demonstrates by a preponderance of the evidence that Reime teaches "circuitry that receives an output from the at least one sensor and provides a non-imagewise input representing the position of the object relative to the pixel array to utilization circuitry."

6. Summary

In sum, based on the arguments and evidence of record, we find that Petitioner demonstrates by a preponderance of the evidence that claim 1 is unpatentable under 35 U.S.C. § 103(a) over Reime.

C. Challenged Claims 5, 8, 12, and 13

Petitioner argues, with specific cites to Reime, that Reime teaches the limitations recited in claims 5, 8, 12, and 13. Pet. 34–35, 38–40. Patent Owner's Response does not separately address Petitioner's arguments directed to these claims. PO Resp. 78–79.

Based on the evidence and arguments of record, we find that Petitioner demonstrates by a preponderance of the evidence that claims 5, 8,

12, and 13 would have been obvious to one of ordinary skill in the art over Reime.

D. Challenged Claim 11

Claim 11 depends from claim 8, which depends from claim 1. Ex. 1001, 68:8–9, 68:17–20. Claim 8 adds "further comprising utilization circuitry" to the device of claim 1. *Id.* at 68:8–9. Claim 11 further recites "wherein the utilization circuitry provides functionality to distinguish at least between directions of motion of the object towards and away from the device." Ex. 1001, 68:17–20.

Petitioner argues that Reime teaches claim 11. Pet. 36; Pet. Reply 27. More specifically, Petitioner argues that Reime teaches that the "sensitivity and the optical response of the light receivers . . . may vary from one application to another." Pet. 36 (quoting Ex. 1010 ¶ 111). Petitioner argues that Reime also teaches "track[ing] the movement of the touching object," including its "up/down motion," and that information can be inputted using the movement. Pet. Reply 27 (citing Ex. 1010 ¶ 108).

In addition, Petitioner argues that one of ordinary skill in the art, in view of Reime, "would have found it obvious to measure motion in multiple dimensions with respect to the device because measuring proximity and object motion was a routine technique in the art at the time, and Reime expressly teaches benefits of measuring 'up/down motion.'" *Id.* (citing Ex. 1035 ¶¶ 57–58). Petitioner also argues that one of ordinary skill in the art "in view of Reime alone, would have found it obvious to also measure different dynamically changing conditions . . . , includ[ing] measuring the changing motion, either toward or away from the device, of nearby impinging objects." Pet. 36 (citing Ex. 1002 ¶ 97). Petitioner adds that one of ordinary skill in the art "would have been motivated in view of Reime's

teachings to include this well-known functionality to, among other things, improve Reime's sensitivity adjustments to account for object motion to achieve well-known benefits, such as improved input recognition sensitivity." *Id.*

Patent Owner argues, *inter alia*, that one of ordinary skill in the art would not have been motivated to modify Reime to distinguish between directions of motion (i.e., towards and away from a device). PO Resp. 72.

Having reviewed Petitioner's arguments and evidence, we agree with Patent Owner that Petitioner does not demonstrate by a preponderance of the evidence that one of ordinary skill in the art would have found it obvious to modify Reime's teachings to distinguish between an object's directions of motion. *In re Nuvasive, Inc.*, 842 F.3d 1376, 1381 (Fed. Cir. 2016) (holding that we must consider whether a person of ordinary skill in the art would have been motivated to combine the prior art to achieve the claimed invention).

First, we find that Reime's teachings about tracking the up/down movement of an object (as opposed to left/right movement) relate to two-dimensional movement, rather than three-dimensional movement. Ex. 1010 ¶ 108. Second, we find that Reime's teaching that "the sensitivity and the optical response of the light receivers . . . may vary from one application to another" does not suggest tracking three-dimensional movement. *Id.* ¶ 111. Rather, this passage relates to at what distance from a touchpad device Reime's sensors detect an object (i.e., when is the object adjacent to the surface). *Id.* ¶¶ 74, 111. Hence, we find that Reime's teachings do not provide sufficient reasoning to modify Reime in the manner Petitioner does.

Moreover, we do not find compelling Dr. Bederson's cited testimony, which in our view, and taken as a whole, uses impermissible hindsight to reconstruct the invention of claim 11. *See* Ex. 1002 ¶ 97; Ex. 1035 ¶¶ 57–58; *Metalcraft of Mayville, Inc. v. The Toro Co.*, 848 F.3d 1358, 1367 (Fed. Cir. 2017) ("[W]e cannot allow hindsight bias to be the thread that stitches together prior art patches into something that is the claimed invention."); *In re Fritch*, 972 F.2d 1260, 1266 (Fed. Cir. 1992) ("It is impermissible to use the claimed invention as an instruction manual or 'template' to piece together the teachings of the prior art so that the claimed invention is rendered obvious." (citation omitted)). In addition, we find that Dr. Bederson's cited testimony is conclusory, and lacks the underlying factual support to guard against impermissible hindsight. *See* Ex. 1002 ¶ 97; Ex. 1035 ¶¶ 57–58.

In sum, we find that Petitioner does not show that one of ordinary skill in the art would have been motivated to modify Reime in the manner Petitioner does. Hence, we determine that Petitioner does not demonstrate by a preponderance of the evidence that claim 11 would have been obvious to one of ordinary skill in the art over Reime.

E. Challenged Claim 26

Claim 26 depends from independent claim 1, and further recites "wherein the at least one sensor comprises a detector assembly arranged at an edge of a viewing plane defining plate." Ex. 1001, 69:1–4. Petitioner argues that Reime teaches this limitation. Pet. 40–41; Pet. Reply 22–24, 28. For the reasons discussed below, we disagree. Below, we parse the limitation into three parts, and first address for context where we agree with Petitioner before addressing why we find Reime fails to teach the limitation.

1. Viewing Plane Defining Plate

Petitioner argues that Reime teaches "a viewing plane defining plate." Pet. 40–41. More specifically, Petitioner argues that Reime teaches that "[i]n a mobile device or other electronic device, the touch pad area 5 can be a display panel such as a liquid crystal display (LCD) 92." Pet. 40 (quoting Ex. 1010 ¶ 86). According to Petitioner, one of ordinary skill in the art "would have understood that a top surface of the LCD panel is a viewing plane-defining plate." *Id.* (citing Ex. 1002 ¶ 107). Additionally, Petitioner argues that "Reime includes a separate viewing plane defining plate on top of the LCD panel." *Id.* In particular, Reime discloses that "[p]referably, the touchpad device 1 also includes a cover plate to provide a touch surface," according to Petitioner. *Id.* at 40–41 (citing Ex. 1010 ¶ 86). Petitioner argues that "[t]he cover plate is a 'viewing plane defining plate,'" as shown in Reime's Figure 8B, where "a 'thin' cover plate 70 is on top of the LCD and defines the LCD viewing plane." *Id.* at 41 (citing Ex. 1010, Fig. 8B).

We agree with Petitioner that each of a top surface of the LCD panel and cover plate 70 is a viewing plane defining plate. Ex. 1010 ¶ 86, Fig. 8B.

2. Includes a Detector Assembly

Petitioner argues that Reime teaches that "the at least one sensor includes a detector assembly." Pet. 40–41; Pet. Reply 22–24. More specifically, Petitioner argues that Reime's "optical sensor components 10, 12, 20, 22, 30 and 32 are mounted in the peripheral area surrounding the LCD 92." *Id.* at 40 (quoting Ex. 1010 ¶ 86; citing Ex. 1010, Figs. 9A–9C). According to Petitioner, "Reime's optical components include the recited detector assembly." Pet. Reply 23 (citing Ex. 1002 ¶¶ 87–88; Ex. 1035 ¶¶ 49–50). Petitioner argues that "Reime includes 'emitters' and 'receivers', or 'optical sensor components 10, 12, 20, 22, 30 and 32,' to detect a nearby

object." *Id.* (citing Ex. 1010 ¶¶ 73, 86; Ex. 2060, 125:11–15, 127:17–21; Ex. 1037, 134:8–13).

We disagree with Petitioner that Reime's emitters (10, 12, 20, and 22) serve to teach the claimed detector assembly. As we construe above, a detector assembly has "two or more detector elements that detect electromagnetic radiation." *Supra* Section III(B)(1). Reime's emitters emit light, rather than detect it. *E.g.*, Ex. 1010 ¶ 86. In contrast, Reime's receivers 30 and 32 receive light. *Id.*

Petitioner also specifically identifies receivers 30 and 32 in arguing that the recited detector assembly is taught. *See* Pet. Reply 23 (citing Ex. 1035 ¶ 50; Ex. 1037, 169:2–17; Ex. 1010 ¶¶ 69, 89).

We agree with Petitioner that Reime's receivers 30 and 32 are two detector elements that detect electromagnetic radiation (i.e., light), and thus, Reime's receivers 30 and 32, collectively, comprise a detector assembly.

3. Arranged at Least One Edge

Petitioner argues that Reime teaches that the detector assembly is "arranged at least one edge of a viewing plane defining plate." Pet. 40–41; Pet. Reply 23–24. For the reasons below, we disagree.

In the Petition, Petitioner argues that "[a]s shown in FIGs. 9A–9C, the emitters and detectors are positioned at the edge of the LCD screen." Pet. 40. Also in the Petition, Petitioner annotates Figure 8B with the label "Optical elements 10 and 12 at edge of LCD and cover plate." *Id.* at 41 (annotating Ex. 1010, Fig. 8B).

As we discuss above, Reime's emitters (e.g., elements 10 and 12) do not teach the detector assembly. *See supra* Section V(E)(2). Thus, on this basis, we are not persuaded by Petitioner's arguments that are based on the placement of Reime's emitters.

In its Reply, however, Petitioner focuses on detectors 30 and 32 (which as we discuss above collectively teach a detector assembly), and argues that "Figure 9E shows detectors 30 and 32 'along the edge' because elements 30 and 32 would appear behind 10 and 12 from Figure 8's view." Pet. Reply 23 (citing Ex. 1035 ¶ 50; Ex. 1037, 169:2–17; Ex. 1010 ¶¶ 69, 89). Petitioner argues that "[t]his is consistent with the '093's specification: '"at edges" is to be interpreted broadly.'" *Id.* (quoting Ex. 1001, 47:14–20).

In addition, Petitioner provides an annotated combination of Reime's Figures 8B and 9E, shown below, in support of its arguments. Pet. Reply 24.

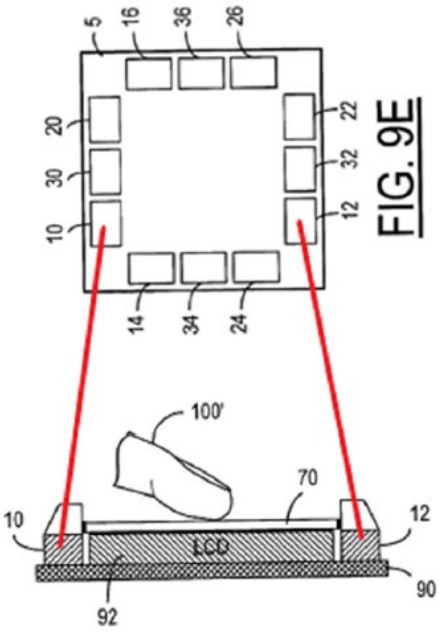

FIG. 9E

FIG. 8B

Figure 8B "is a cross-sectional side view showing a touch pad device having an LCD and a thin cover on top of the LCD for touching." Ex. 1010 ¶ 49. Figure 9E "is a diagrammatic representation showing a touch pad device having four groups of optical sensor components placed within the touch pad area." *Id.* ¶ 56. In making this combination of figures, Petitioner rotates

Figure 9E ninety degrees counterclockwise and places it higher up on the page above Figure 8B. Pet. Reply 24. Petitioner then annotates the combined figures by drawing a red line from element 10 on Figure 8B to element 10 on Figure 9E, and drawing a second red line connecting elements 12 on each of the figures. *Id.*

We find that Petitioner fails to show that Reime's detector assembly (i.e., receivers 30 and 32, collectively) is "arranged at least one edge of a viewing plane defining plate." Petitioner fails to clearly identify how Reime teaches this part of the limitation, including failing to clearly identify what edge Petitioner contends the detector assembly (i.e., receivers 30 and 32, collectively) is arranged at. *See id.* at 23–24. As best we can determine from the Reply, Petitioner argues that receivers 30 and 32 are mounted "about the edges" of the LCD because receivers 30 and 32 are coplanar and looking from a side view (e.g., Figure 8B), both 30 and 32 would be "about" the edge that constitutes the height of the plate (e.g., cover plate 70, which Reime describes as thin). *Id.* Petitioner then argues that Reime teaches this limitation because "at an edge" is to be interpreted broadly as including structures which are located about an edge. *Id.*

We are not persuaded by Petitioner's arguments. We agree that the '093 patent states the following:

> It is appreciated that the phrase "at edges" is to be interpreted broadly as including structures which are located behind edges, as in the embodiments shown in FIGS. 10A–10D, 11A–11lD, 15A–15D and 16A–16D[,] about edges as in the embodiments shown in FIGS. 9A–9D and 14A–14D, and along edges as in the embodiments shown in FIGS. 4–7, 8A–8D, 12A–12D and 13A–13D.

Ex. 1001, 47:14–20. However, we do not view this statement to mean that any structures that are coplanar necessarily are "about" an edge and thus,

also "at an edge." The embodiments the statement identifies have detector assemblies that are along an edge by being adjacent (next to) an edge of the plate. *See* Ex. 1001, Figs. 4–7, 8A–8D, 12A–12D, 13A–13D. In addition, the claim recites that the edge is of a "viewing plane defining plate." A side view of a device (e.g., Fig. 8B) is inconsistent with a viewing plane (i.e., looking down on the device), such as shown in Fig. 9E.

In addition, to the extent that Petitioner is arguing that both receiver elements 30 and 32 (which together teach a detector assembly—two or more detector elements) are sufficiently close to one edge, we disagree. Pet. Reply 23–24. Rather, Reime teaches that each of these receivers 30 and 32 are centered on opposite edges of the plate. *See, e.g.*, Ex. 1010, Figs. 9C–9F. And an emitter (e.g., elements 10 and 12) is between each receiver and the edge on either end. *E.g.*, *id.*

4. Summary

In sum, we find that Petitioner does not show by a preponderance of the evidence that Reime teaches "wherein the at least one sensor comprises a detector assembly arranged at an edge of a viewing plane defining plate." Thus, Petitioner has not demonstrated by a preponderance of the evidence that claim 26 of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime.

F. Challenged Claims 29 and 36–38

Claims 29 and 36–38 depend (directly or indirectly) from claim 26, and thus, incorporate claim 26's limitations. We determine above that Reime fails to teach claim 26. In addition, the Petition does not present arguments with respect to claims 29 and 36–38 that address the deficiencies discussed above regarding claim 26. Pet. 41–45. Thus, Petitioner has not demonstrated by a preponderance of the evidence that claims 29 and 36–38

of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime.

G. Challenged Claim 44

Among independent claim 44's limitations is "a detector assembly arranged at an edge of a viewing plane defining plate." Ex. 1001, 70:3–4. Petitioner relies on its showing for claim 26 for teaching this limitation. Pet. 47 (citing Pet. 40–41) (arguing that the Petition "discuss[es] the same element in [c]laim 26"). Petitioner's showing for this limitation thus fails for the same reasons as its showing for claim 26. *See supra* Section V(E). Accordingly, Petitioner has not demonstrated by a preponderance of the evidence that claim 44 of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime.

H. Challenged Claims 45, 46, 48, 49, and 56–58

Claims 45, 46, 48, 49, and 56–58 depend (directly or indirectly) from independent claim 44, and thus, incorporate claim 44's limitations. We determine above that Reime fails to teach claim 44. In addition, the Petition does not present arguments with respect to these dependent claims that address the deficiencies discussed above regarding claims 26 and 44. Pet. 54–61. Thus, Petitioner has not demonstrated by a preponderance of the evidence that claims 45, 46, 48, 49, and 56–58 of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime.

VI. ALLEGED OBVIOUSNESS OVER REIME AND HINCKLEY

Petitioner argues that the combination of Reime and Hinckley renders claims 1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, and 56–58 obvious. Pet. 19–61.

A. Claims 1, 5, 8, 12, and 13

This ground of unpatentability also challenges claims 1, 5, 8, 12, and 13, which we already determine are unpatentable over Reime. *See supra* Section V(B)–(C). Under the circumstances of this case, analyzing claims which we have determined to be unpatentable for an additional ground would not be an efficient use of the Board's time and resources. *See Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App'x 984, 990 (Fed. Cir. 2020) ("We agree that the Board need not address issues that are not necessary to the resolution of the proceeding.").

Accordingly, we do not reach this ground for claims 1, 5, 8, 12, and 13. *See In re Gleave*, 560 F.3d 1331, 1338 (Fed. Cir. 2009) (not reaching other grounds of unpatentability after affirming the anticipation ground); *see also Beloit Corp. v. Valmet Oy*, 742 F.2d 1421, 1423 (Fed. Cir. 1984) (determining once a dispositive issue is decided, there is no need to decide other issues).

B. Claims 26, 29, 36–38, 44–46, 48, 49, and 56–58

We determine above that Petitioner does not show by a preponderance of the evidence that Reime teaches claims 26, 29, 36–38, 44–46, 48, 49, and 56–58. *See supra* Section V(E)–(H). For this ground asserting Reime and Hinckley, Petitioner relies on the same showing from Reime which we found was deficient for these claims. Pet. 40–61; *supra* Section V(E)–(H). Thus, Petitioner has not demonstrated by a preponderance of the evidence that claims 26, 29, 36–38, 44–46, 48, 49, and 56–58 of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime and Hinckley.

C. Claim 11

Claim 11 recites "wherein the utilization circuitry provides functionality to distinguish at least between directions of motion of the object towards and away from the device." Ex. 1001, 68:17–20. Above we address whether Reime alone teaches this claim, and we find that Reime does not. We now address the parties' arguments for whether the combination of Reime and Hinckley teaches claim 11. For the reasons below, we find that Petitioner shows by a preponderance of the evidence that the combination of Reime and Hinckley teaches claim 11.

1. Petitioner's Arguments

We address Petitioner's arguments above concerning what Reime teaches to one of ordinary skill in the art. *See supra* Section V(D). In addition, Petitioner argues that Hinckley teaches "controlling device power consumption based on the presence and motion . . . of an object within different levels of 'nearness' to the device, . . . and activating an audio receiver based on proximity." Pet. 37 (citing Ex. 1011 ¶¶ 62, 106–108). Petitioner argues "[f]or example, Hinckley teaches that if the user takes the device away from their mouth, the audio receiver would be deactivated." *Id.* (citing Ex. 1011 ¶ 66). Petitioner argues that "Hinckley further teaches 'prevent[ing] a mobile device from entering an idle mode if the user is handling the device or gesturing toward the device.'" *Id.* (quoting Ex. 1011 ¶ 106).

In addition, Petitioner argues that one of ordinary skill in the art "would have been motivated to modify Reime based on the teachings of Hinckley because Reime teaches that the 'sensitivity and the optical response of the light receivers . . . may vary from one application to another." *Id.* at 37–38 (quoting Ex. 1010 ¶ 111). "Hinckley teaches

applications where the optical responses of the light receivers are judged based on proximity and motion," according to Petitioner. *Id.* at 38 (citing Ex. 1011, Fig. 7, ¶¶ 66–67, 104, 106–107). Petitioner argues that one of ordinary skill in the art "would have been motivated to modify Reime to obtain such features and benefits, for example, to preserve power by turning features off when an object moves away from the device, such as entering the 'OutOfRange' distance as described by Hinckley." *Id.* (citing Ex. 1011, Fig. 7, Table 3; Ex. 1002 ¶ 100). In other words, one of ordinary skill in the art "would have included such a feature to ensure that power is not wasted when the user puts down the Reime device," according to Petitioner. *Id.* (citing Ex. 1002 ¶ 100); *see also* Pet. Reply 28 (citing Ex. 1035 ¶ 60).

In addition, Petitioner argues that one of ordinary skill in the art "would have had a reasonable expectation of success in combining the teachings of Reime with Hinckley's motion detection functionality." *Id.* (citing Ex. 1002 ¶ 101). According to Petitioner, "[e]ach purports to solve these problems in similar and predictable ways by using well-known position sensors," and that "[t]here is nothing unique or specific about motion detection functionality described in the patent, and the art, in fact, makes clear that such approaches were well-understood at the time." *Id.*

2. Patent Owner's Arguments

Patent Owner disputes that the combination of Reime and Hinckley teaches claim 11. *See* PO Resp. 71–74; PO Sur-reply 29–30. More specifically, Patent Owner argues that "Hinkley only mentions 'motion' in the context of determining whether a motion exists, but Hinckley does not teach or suggest *distinguishing* between the claimed directions of motion—e.g., toward or away relative to the device." PO Resp. 73 (citing Ex. 1011 ¶¶ 66, 106–107; Ex. 2056 ¶ 160).

In addition, Patent Owner argues that "Reime does not concern or care about proximity let alone directions of motion toward or away," and "teaches away from the claimed directions of motion and generalizes the phrase 'touching the surface' to include 'making contact with the surface' or 'being adjacent to the surface' because the object's actual proximity or z-distance is irrelevant to Reime's x-y measurements." *Id.* at 72–73 (citing Ex. 1010 ¶ 74; Ex. 2056 ¶ 158).

In addition, Patent Owner argues that "Petitioner fails to explain how [one of ordinary skill in the art] could conceivably modify Reime's x-y touch detection panel with Hinkley's proximity sensor to detect movement." *Id.* at 73 (citing Ex. 2056 ¶ 161). In particular, Patent Owner argues that one of ordinary skill in the art "would not have understood how to modify Reime to make such modifications because the record demonstrates such modification would require redesign and/or significant experimentation." *Id.* at 74 (citing Ex. 2056 ¶ 162; Exs. 2061–2063). Patent Owner adds that "designing and combining [Infra-Red ("IR")] technologies to detect an object's position and relative direction of motion continues to present significant challenges today." *Id.* at 72 (citing Ex. 2056 ¶ 156).

3. Our Analysis

We agree with Petitioner and find that Hinckley teaches distinguishing between an object moving towards or away from a device. *See* Ex. 1011 ¶¶ 62, 66, 106–107; Ex. 1002 ¶ 100; Pet. 37. In particular, Hinckley teaches, *inter alia*, an audio receiver having "a proximity sensor that senses when the input device is close to the user." Ex. 1011 ¶ 62. For example, Hinckley teaches using proximity to determine when to deactivate

the audio receiver, including when "the user takes the device *away* from their mouth." *Id.* ¶ 66 (emphasis added).

In addition, Hinckley teaches using idle mode for a device, "which reduces the power consumption of the device," but "[u]nder certain types of usage, users find that the system powers down when they would rather have it remain active." *Id.* ¶ 106. To that end, Hinckley teaches "prevent[ing] a mobile device from entering an idle mode if the user is . . . *gesturing toward the device*." *Id.* (emphasis added). More specifically, Hinckley teaches that "the device is prevented from entering an idle mode when . . . there is motion near the device," which "can be detected by changes in the output of the proximity sensor and is indicative of a user gesturing toward the device." *Id.* ¶ 107.

Thus, we find that Hinckley teaches determining when an object is moving away from or toward a device, and hence teaches distinguishing between such movements. *See* Ex. 1011 ¶¶ 62, 66, 106–107.

In addition, we find that Petitioner provides articulated reasoning to combine Hinckley's cited teachings with Reime. In particular, we are persuaded by Dr. Bederson's testimony that one of ordinary skill in the art would have been motivated to modify Reime to include Hinckley's features and benefits. Ex. 1002 ¶ 100. As testified to by Dr. Bederson, these benefits include "preserv[ing] power by turning features off when an object moves away from the device, such as entering the 'OutOfRange' distance as described by Hinckley." *Id.* (citing Ex. 1011, Fig. 7, Table 3). In other words, one of ordinary skill in the art "would have included such a feature to ensure that power is not wasted when the user puts down the Reime device." *Id.*; *see also* Ex. 1035 ¶ 60. This rationale is expressly taught by Hinckley. *See* Ex. 1011 ¶¶ 106–107, Fig. 7, table 3. In addition, Hinckley also teaches

the additional benefit of preventing a mobile device from entering an idle mode, which would be unwanted, if the user is gesturing toward the device. *Id.* ¶¶ 106–107; *see also* Ex. 1002 ¶¶ 99–100 (testifying as to benefits taught by Hinckley that would have motivated one of ordinary skill in the art to combine Hinckley's teachings about sensing movement direction with Reime). Accordingly, we find that Petitioner provides "articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *Kahn*, 441 F.3d at 988.

We find unavailing Patent Owner's arguments concerning Reime not caring about proximity and teaching away from distinguishing directions of motion. PO Resp. 72–73. Patent Owner overreads Reime's teaching that "[i]t is not necessary for the object . . . to physically touch or press the area . . . at a touching point," and that "touching the surface," "can be interpreted as 'making contact with the surface' or 'being adjacent to the surface.'" Ex. 1010 ¶ 74. This does not teach that Reime does not care about proximity or motion, as Patent Owner argues, but instead teaches that Reime's discussion of "touching" should be read broadly to include proximate objects. *Id.* Notably, Reime also teaches about differences in detecting a finger that is approaching a surface and when the finger makes contact with the surface, including as to increases and decreases of the light received by a receiver. *Id.* ¶ 86. Thus, Reime clearly teaches about the difference in touching and being proximate. *E.g.*, *id.*

We also find unavailing Patent Owner's arguments that one of ordinary skill in the art would not have understood how to combine Hinckley's teachings with Reime. PO Resp. 72–74. As an initial matter, Patent Owner's arguments largely focus on the physical differences between Reime's and Hinckley's systems and require bodily incorporating

Hinckley's sensor into Reime's device. However, "[i]t is well-established that a determination of obviousness based on teachings from multiple references does not require an actual, physical substitution of elements." *In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. June 26, 2012); *In re Etter*, 756 F.2d 852, 859 (Fed. Cir. 1985) (en banc); *In re Keller*, 642 F.2d 413, 425 (CCPA 1981) (Obviousness does not require that all of the features of the secondary reference be bodily incorporated into the primary reference.).

In addition, we credit Dr. Bederson's testimony that one of ordinary skill in the art "would have had a reasonable expectation of success in combining the teachings of Reime with Hinckley's motion detection functionality," and that "[t]here is nothing unique or specific about motion detection functionality described in the patent, and the art, in fact, makes clear that such approaches were well-understood at the time." Ex. 1002 ¶ 101. We find that this testimony is consistent with the cited art that readily describes the detection functionality. *Compare id.*, *with* Ex. 1010 ¶ 86 (describing how optical sensor components detect that a finger is approaching versus touching) *and* Ex. 1011 ¶¶ 42–43 (describing the functioning of the proximity sensor). For example, Hinckley teaches that the light produced by a proximity sensor's transmitter bounces off objects that are near the mobile device and the reflected light is received by the receiver, which "typically has an automatic gain control such that the strength of the received signal is proportional to the distance to the object." Ex. 1011 ¶¶ 42–43.

Moreover, we find unavailing Patent Owner's reliance on Exhibits 2061,[9] 2062,[10] and 2063.[11] Patent Owner does not explain how these exhibits relate to Reime's and Hinckley's clear teachings about detection and claim 11.

In sum, we determine that Petitioner demonstrates by a preponderance of the evidence that claim 11 would have been obvious to one of ordinary skill in the art over Reime and Hinckley.

VII. ALLEGED OBVIOUSNESS OVER REIME, HINCKLEY, AND ELIASSON

Petitioner argues that the combination of Reime, Hinckley, and Eliasson renders obvious claim 48. Pet. 4, 61–64. Claim 48 depends indirectly from independent claim 44, and thus, incorporate claim 44's limitations. We determine above that Reime fails to teach claim 44. In addition, the Petition does not present arguments with respect to claim 48 that address the deficiencies discussed above regarding claim 44. Pet. 61–64. Thus, Petitioner has not demonstrated by a preponderance of the evidence that claim 48 of the '093 patent would have been obvious to one of ordinary skill in the art in view of Reime, Hinckley, and Eliasson.

VIII. PATENT OWNER'S MOTION TO EXCLUDE

Patent Owner filed a Motion to Exclude certain of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) arguing that the testimony is not relevant or has little probative value. Mot. 1. In particular, Patent

---

[9] Tomi Koskela, *LED Backlighting for LCDs Requires Unique Drivers, Electronic Design*, National Semiconductor, May 12, 2008.
[10] Erica Naone, *Gesturing at Your TV Isn't Ready for Prime Time*, MIT Technology Review, Nov. 8, 2010.
[11] Steven Li, *Hardware Design Guide to Smartphone Ambient-Light Sensing, Electronic Design*, Electronic Design, May 3, 2016.

Owner argues that we should exclude paragraphs 7, 9, 10, 12, 14–16, 18, 20–23, 25–27, 29, 31, 33, 35–38, 40–42, 44, 46–48, 50, 52, 54, 56, 58, 62, and 64–67 under Federal Rules of Evidence 401 and 403. Mot. 1.

Patent Owner first argues that paragraphs 7, 9, 10, 12, 14–16, 18, 20–23, 25–27, 29, 31, 33, and 35–37 "are introduced for the sole purpose of supporting attorney argument against Patent Owner's proposed claim constructions." *Id.* at 1–2. Second, Patent Owner argues that paragraphs 38, 40–42, 44, 46–48, 50, 52, 58, and 62 "are introduced for the sole purpose of supporting attorney argument in support of Petitioner's Grounds 1–2." *Id.* at 2. Third, Patent Owner argues that paragraphs 64–67 "are introduced for the sole purpose of supporting attorney argument in support of Petitioner's Ground 3." *Id.* at 3.

Patent Owner relies on the Federal Rules of Evidence 401 through 403 as legal support for its arguments that the identified paragraphs are inadmissible. *See generally id.* In particular, Patent Owner argues that the testimony in these paragraphs is not adequately supported by record, and as such does not constitute proper opinion testimony. *Id.* at 1–3. Patent Owner adds that the testimony mischaracterizes the record and the teachings of the '093 patent or prior art, and is confusing on this basis. *Id.*

In its Opposition, Petitioner provides a table including the testimony in each contested paragraph, along with citations to the record set forth in that testimony, and the corresponding argument in Patent Owner's Response that the testimony responds to. Opp. 3–12. Petitioner argues, in contrast to Patent Owner's arguments, Dr. Bederson's testimony directly responds to arguments in Patent Owner's Response and, therefore, is highly relevant and probative of the issues raised by Patent Owner. *Id.* at 2. Petitioner also argues that Bederson's testimony "is replete with citations to the record" and

is "well-supported" proper expert testimony. *Id.* (citing Fed. R. Evid. 702–704).

Moreover, Petitioner argues that the probative value of Dr. Bederson's testimony in his Reply Declaration (Ex. 1035) is not outweighed by any unfair prejudice or confusion. Opp. 12–13. Petitioner argues that Patent Owner's arguments in that regard are conclusory and unsupported. *Id.* at 12. Petitioner further argues any "alleged 'prejudice'" is Patent Owner's "own making" because Patent Owner did not take a deposition to cross-examine Dr. Bederson regarding his testimony in his Reply Declaration. *Id.* at 2.

We find persuasive Petitioner's arguments on the relevancy and the probative value of the expert testimony at issue. Patent Owner does not provide any specific explanations as to why the testimony at issue is irrelevant or has little or no probative value. Federal Rule of Evidence 401 provides that evidence is relevant if it "has any tendency to make a fact more or less probable than it would be without the evidence" and "the fact is of consequence in determining the action." Fed. R. Evid. 401; Fed. R. Evid. 402 ("Relevant evidence is admissible."). Courts have characterized the relevance threshold as being "very low." *United States v. White*, 692 F.3d 235, 246 (2nd Cir. 2012) (quoting *United States v. Al-Moayad*, 545 F.3d 139, 176 (2nd Cir. 2008)). Under this standard, we find that Dr. Bederson's testimony is relevant. Additionally, under the circumstances here, a bench trial, Rule 403 has limited applicability. *See, e.g.*, *Schultz v. Butcher III*, 24 F.3d 626, 632 (4th Cir. 1994). Patent Owner does not provide explanation as to why there would be prejudice to it and we can weigh the evidence without improper inference. Accordingly, we do not find a basis for exclusion under Federal Rule of Evidence 403.

We agree with Petitioner (Opp. 2) that Patent Owner's arguments go to the weight we should give Dr. Bederson's testimony, not its admissibility. Patent Owner has not been left without an opportunity to address the Reply argument and evidence. In fact, Patent Owner filed a Sur-reply responding to Petitioner's arguments and evidence in its Reply regarding claim construction and patentability. *See generally* PO Sur-reply. Also, Patent Owner had the opportunity, but declined to depose Dr. Bederson on his Reply Declaration.

For the reasons given, we *deny* Patent Owner's Motion to Exclude.

IX. CONCLUSION[12]

Based on the full record, we determine that Petitioner shows by a preponderance of the evidence that (i) claims 1, 5, 8, 12, and 13 are unpatentable over Reime; and (ii) claim 11 is unpatentable over Reime and Hinckley. We also determine that Petitioner does not show by a preponderance of the evidence that (i) claims 11, 26, 29, 36–38, 44–46, 48, 49, and 56–58 are unpatentable over Reime; (ii) claims 26, 29, 36–38, 44–46, 48, 49, and 56–58 are unpatentable over Reime and Hinckley; and (iii) claim 48 is unpatentable over Reime, Hinckley, and Eliasson. We also deny Patent Owner's Motion to Exclude.

---

[12] 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).

Claim(s)	35 U.S.C. §	Reference(s) /Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, 56–58	103(a)	Reime	1, 5, 8, 12, 13	11, 26, 29, 36–38, 44–46, 48, 49, 56–58
1, 5, 8, 11–13, 26, 29, 36–38, 44–46, 48, 49, 56–58	103(a)[13]	Reime, Hinckley	11	26, 29, 36–38, 44–46, 48, 49, 56–58
48	103(a)	Reime, Hinckley, Eliasson		48
Overall Outcome			1, 5, 8, 11–13	26, 29, 36–38, 44–46, 48, 49, 56–58

X. ORDER

In consideration of the foregoing, it is hereby

ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has shown by a preponderance of the evidence that claims 1, 5, 8, and 11–13 of the '093 patent are unpatentable;

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(a), Petitioner has not shown by a preponderance of the evidence that claims 26, 29, 36–38, 44–46, 48, 49, and 56–58 of the '093 patent are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Exclude (Paper 28) is *denied*; and

[13] Because we determine that claims 1, 5, 8, 12, and 13 challenged in this ground are unpatentable under § 103(a) over Reime, we decline to address these claims for this ground.

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

For PETITIONER:

Ryan Yagura
Ben Haber
Nicholas Whilt
O'MELVENY & MYERS LLP
ryagura@omm.com
bhaber@omm.com
nwhilt@omm.com

For PATENT OWNER:

Stephen McBride
James T. Carmichael
CARMICHAEL IP, PLLC
stevemcbride@carmichaelip.com
jim@carmichaelip.com

Jason Wietjes
Adam Daniels
James Murphy
POLSINELLI PC
jwietjes@polsinelli.com
adaniels@polsinelli.com
jpmurphy@polsinelli.com