APPENDICES

APPENDIX A

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2020-1683, 2020-1763, 2020-1764, 2020-1827

APPLE INC.,

Appellant,

v.

QUALCOMM INCORPORATED,

Appellee.

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2018-01276, IPR2018-01281, IPR2018-01282, IPR2018-01460.

Decided: November 10, 2021

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* * *

Before NEWMAN, PROST, and STOLL, *Circuit Judges*.

Opinion for the court filed by *Circuit Judge* PROST.

Dissenting opinion filed by *Circuit Judge* NEWMAN.

PROST, *Circuit Judge*.

Apple Inc. ("Apple") appeals four decisions of the Patent Trial and Appeal Board ("Board") determining that claims of patents owned by Qualcomm Inc. ("Qualcomm") weren't proven unpatentable. This is the second such dispute to reach us since these parties settled

all their patent-infringement litigation worldwide and entered a global patent license agreement. In the first, we dismissed because Apple lacked Article III standing before this court. *Apple Inc. v. Qualcomm Inc.*, 992 F.3d 1378, 1385 (Fed. Cir. 2021) ("*Apple I*"). Along the way, *Apple I* foresaw that the standing issue "impacts ... other appeals." *Id.* at 1382. Confronted here with identical operative facts, we do no more than follow in the wake of *Apple I*. We dismiss.

BACKGROUND

I

We begin with a flashback to *Apple I*. First, Qualcomm accused Apple in the Southern District of California of infringing various patents. *Id.* at 1381. Next, Apple petitioned the Board for inter partes review ("IPR") of those patents.[1] *Id.* Then, in 2019, the parties settled all their patent-infringement litigation worldwide and entered a six-year global patent license agreement with a two-year extension option, resulting in dismissal of the infringement case with prejudice. *Id.* After the Board determined that Apple failed to prove various claims unpatentable, Apple appealed and Qualcomm challenged Apple's standing. *Id.*

Apple responded with three theories. First, Apple asserted standing under *MedImmune, Inc. v. Genentech, Inc.*, 549 U.S. 118 (2007), highlighting its "ongoing payment obligations that are a condition for certain rights in the license agreement." *Apple I*, 992 F.3d at 1383. But the *Apple I* court saw in this argument a "fatal" failure of proof: Apple "nowhere argue[d] or provide[d] evidence that the validity of any single patent ... would affect its ongoing payment obligations,"

[1] U.S. Patent Nos. 7,844,037 and 8,683,362.

nor "identif[ied] any contractual dispute … that relates to, or could be resolved through a validity determination of, the patents at issue." *Id.* at 1383-84. Second, Apple relied on "the threat that [it] will be sued for infringing … after the expiration of the license agreement." *Id.* at 1383. Once again, *Apple I* noted "deficiencies in [Apple's] evidence"—for example, that Apple submitted "the sparsest of declarations," which didn't "even mention the patents at issue" or "set forth any plans to engage in conduct after the expiration of the license agreement that might lead to an infringement suit." *Id.* at 1384. For this and other reasons, *Apple I* also rejected Apple's third theory, that 35 U.S.C. § 315(e) would likely estop it from challenging these patents in the future. *Id.* at 1385 (rejecting "invocation of the estoppel provision as a sufficient basis for standing" (quoting *AVX Corp. v. Presidio Components, Inc.*, 923 F.3d 1357, 1362-63 (Fed. Cir. 2019))). Consequently, *Apple I* dismissed Apple's appeal for lack of standing.

II

We turn now to these consolidated appeals. As with the *Apple I* patents, Qualcomm accused Apple in the Southern District of California of infringing the patents at issue here. And, like in *Apple I*, Apple petitioned the Board to review those patents.[2] Then came the settlement and license agreement, resulting in dismissal of the district court action with prejudice. After that, the Board issued final written decisions concluding (like in *Apple I*) that Apple hadn't proven various claims unpatentable. Apple appealed, Qualcomm

[2] U.S. Patent Nos. 9,024,418 (subject of IPR2018-01460), 8,768,865 (subject of IPR2018-01281 and IPR2018-01282), and 8,971,861 (subject of IPR2018-01276).

moved to dismiss for lack of standing, and Apple filed an opposition supported by the exact same declarations it submitted in *Apple I*. We denied Qualcomm's motion and directed the parties to address standing in their briefs.

Apple I issued when merits briefing across these appeals was complete except for one reply brief. In that brief, Apple acknowledged that we are "bound by the specific holdings of the prior panel." Reply Br. 26.[3] Although Apple said it "presented additional arguments" that "the prior panel decision did not address," the only such argument it identified was a request (in that last brief) that we vacate the Board's underlying decisions if we dismiss for lack of jurisdiction. Reply Br. 26. Qualcomm, for its part, raised *Apple I* in a supplemental authority letter—asking us to "summarily dismiss … without argument" because *Apple I* was "based on identical facts" and "rejected the same arguments" made here. Citation of Suppl. Authority at 1–2 (April 16, 2021), ECF No. 49. Apple didn't respond.

After the en banc court denied rehearing in *Apple I*, Qualcomm submitted another supplemental authority letter repeating its request. Citation of Suppl. Authority at 1 (July 21, 2021), ECF No. 65. This time, Apple responded: "Although Apple continues to disagree with [*Apple I*], in light of that decision and the … order denying Apple's petition for rehearing en banc, Apple believes that the present appeal can be resolved on the briefs without the need for oral argument." Resp. to Citation of Suppl. Authority at 1 (July 23, 2021), ECF No. 66 ("Appellant's 28(j) Response"). Apple then

[3] For simplicity, all citations to the appellate record are to No. 20-1827.

asked us to "vacate the current oral argument and resolve the appeal without argument" as we "deem[] appropriate." Appellant's 28(j) Response at 1. Shortly thereafter, the parties filed a joint motion to "vacate oral argument." Joint Mot. at 1 (July 27, 2021), ECF No. 67 (capitalization normalized). We instead held a consolidated oral argument. There, Apple reiterated its disagreement with *Apple I* but acknowledged that the operative facts in this case were "the same." Oral Arg. at 6:40-43, 38:30-58.[4]

DISCUSSION

The Constitution limits federal judicial power to deciding "Cases" or "Controversies." U.S. CONST. art. III, § 2. Constitutional standing doctrine, which "limits the category of litigants empowered to maintain a lawsuit in federal court," flows from this requirement. *Spokeo, Inc. v. Robins*, 578 U.S. 330, 338 (2016). To establish standing, the party invoking federal jurisdiction must demonstrate (1) an "injury in fact" that is (2) "fairly traceable" to the defendant's challenged conduct and is (3) "likely to be redressed by a favorable judicial decision." *Id.* That's the "irreducible constitutional minimum." *Id.* (quoting *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 560 (1992)).

Article III standing "is not necessarily a requirement to appear before an administrative agency." *Consumer Watchdog v. Wis. Alumni Rsch. Found.*, 753 F.3d 1258, 1261 (Fed. Cir. 2014). IPR petitioners, for example, "may lack constitutional standing." *Cuozzo Speed Techs., LLC v.Lee*, 136 S. Ct. 2131, 2143-44 (2016) (first citing 35 U.S.C. § 311(a); and then citing *Consum-*

[4] https://oralarguments.cafc.uscourts.gov/default.aspx?fl=20-1827_08022021.mp3.

er Watchdog, 753 F.3d at 1261-62). But the standing requirement "'kicks in'" when "a party seeks review in a federal court." *Consumer Watchdog*, 753 F.3d at 1261 (quoting *Sierra Club v. EPA*, 292 F.3d 895, 899 (D.C. Cir. 2002)). Indeed, the "requirement of injury in fact is a hard floor of Article III jurisdiction that cannot be removed by statute." *Id.* (quoting *Summers v. Earth Island Inst.*, 555 U.S. 488, 497 (2009)). Such injury must be "concrete and particularized and actual or imminent, not conjectural or hypothetical." *Spokeo*, 578 U.S. at 339 (cleaned up). For example, it's generally enough for an IPR petitioner to show that "it has engaged in, is engaging in, or will likely engage in 'activity that would give rise to a possible infringement suit.'" *Grit Energy Sols., LLC v. Oren Techs., LLC*, 957 F.3d 1309, 1319 (Fed. Cir. 2020) (quoting *Consumer Watchdog*, 753 F.3d at 1262).

I

We do not write on a blank slate in assessing Apple's standing here. Rather, as presaged above, the writing is already on the wall. As Apple admits, "the operative facts are the same" here as in *Apple I*. Oral Arg. at 6:40-43. In both cases Qualcomm sued Apple for patent infringement, Apple petitioned for IPR, the parties settled and licensed, Apple failed to prove certain claims unpatentable at the Board, and Apple appealed. Even Apple's declarations in support of standing are the same. True, the patents are different. But that's irrelevant because the settlement and license agreement cover both sets of patents. The cases are on all fours.

Nonetheless, Apple raises a "nuance" that it says *Apple I* didn't "specifically address[]." Oral Arg. at 6:35-39. In its view, *Apple I* "did not explain why the

threat of liability, if Apple ceases the ongoing payment and the agreement is terminated, is not a sufficient injury to support standing." Oral Arg. at 5:00-40. But we're unconvinced that this "nuance" allows us to turn back the clock on *Apple I*. "Panel opinions are, of course, opinions of the court and may only be changed by the court sitting en banc." *Robert Bosch, LLC v. Pylon Mfg. Corp.*, 719 F.3d 1305, 1316 (Fed. Cir. 2013) (en banc). As a panel, we're bound by stare decisis. We can't defy *Apple I* by dealing differently with its double. And as Apple acknowledges, this "nuance" was at the heart of its denied en banc petition in *Apple I*. Oral Arg. at 5:40-6:18. Per *Apple I*, therefore, we dismiss for lack of standing.

II

Next we consider Apple's request that, if we lack jurisdiction, we should vacate the Board's decisions "to eliminate any doubt about the applicability of estoppel." Reply Br. 25–26. In support, Apple cites *United States v. Munsingwear, Inc.*, which directs courts to vacate the underlying decision in certain appeals that have become moot during their pendency, "clear[ing] the path for future relitigation." 340 U.S. 36, 40 (1950).[5] We see no good reason why, in view of the settlement and our directive to address standing in the merits briefs, Apple made this request only in its last-filed reply brief and at oral argument instead of in its opening brief.

At any rate, the request is misplaced. *Munsingwear* concerns mootness, not standing. To be sure, the doctrines together require that "[a]t all stages of

[5] *Munsingwear* is "at least equally applicable to unreviewed administrative orders." *A.L. Mechling Barge Lines, Inc. v. United States*, 368 U.S. 324, 329 (1961).

litigation, a plaintiff must maintain a personal interest in the dispute." *Uzuegbunam v. Preczewski*, 141 S. Ct. 792, 796 (2021). But they are distinct. "The doctrine of standing generally assesses whether that interest exists at the outset, while the doctrine of mootness considers whether it exists throughout the proceedings." *Id.* Because Apple's injury disappeared before it invoked our jurisdiction, Apple's problem is lack of standing at the outset of the appeal, not mootness. As Apple recognizes, "*Munsingwear*-type vacatur arises where a case has become moot while the case is on appeal." Oral Arg. at 1:22-40; *see, e.g.*, *Gould v. Control Laser Corp.*, 866 F.2d 1391, 1395 (Fed. Cir. 1989) (explaining that *Munsingwear* did not apply where a settlement and consent judgment entered before appeal "foreclosed this court from obtaining jurisdiction"). Apple asks us to "extend that approach to the facts of this case," which it believes "include an element of mootness." Oral Arg. at 1:22–40. That's an invitation to "confuse[] mootness with standing." *Friends of the Earth, Inc. v. Laidlaw Env't Servs. (TOC), Inc.*, 528 U.S. 167, 189 (2000). We decline it.

And even if this could be framed as mootness, vacatur would *still* be inappropriate because the jurisdiction-destroying event is a settlement Apple voluntarily entered. The decision whether to vacate hinges on the "conditions which have caused the case to become moot," especially "whether the party seeking relief from the judgment below caused the mootness by voluntary action." *U.S. Bancorp Mortg. Co. v. Bonner Mall P'ship*, 513 U.S. 18, 24 (1994) (cleaned up). To one side are cases in which an appellant, "frustrated by the vagaries of circumstance" or the "unilateral action" of the appellee, "ought not in fairness be forced to acquiesce in the judgment." *Id.* at 25. To the other are cases

like this one, in which "mootness results from settlement" such that "the losing party has voluntarily forfeited his legal remedy … thereby surrendering his claim to the equitable remedy of vacatur." *Id.* The lines, therefore, are already drawn for us. "[M]ootness by reason of settlement does not justify vacatur of a judgment under review." *Id.* at 29.[6] We therefore deny Apple's request.

CONCLUSION

We consistently dismiss IPR appeals if the petitioner lacks standing. *E.g.*, *Phigenix, Inc. v. Immunogen, Inc.*, 845 F.3d 1168, 1176 (Fed. Cir. 2017); *JTEKT Corp. v. GKN Auto. LTD.*, 898 F.3d 1217, 1221 (Fed. Cir. 2018); AVX, 923 F.3d at 1367; *Gen. Elec. Co. v. United Techs. Corp.*, 928 F.3d 1349, 1355 (Fed. Cir. 2019); *Argentum Pharms. LLC v. Novartis Pharms. Corp.*, 956 F.3d 1374, 1378 (Fed. Cir. 2020). More than that, we have a case on point here: *Apple I*. We therefore end where we began. *Apple I* controls. We have considered Apple's remaining arguments but find them unpersuasive. Because Apple lacks Article III standing, we dismiss for lack of jurisdiction.

DISMISSED

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[6] For the first time at oral argument, Apple relied on *Alvarez v. Smith*, 558 U.S. 87, 94-97 (2009) and *American Family Life Assurance Co. of Columbus v. FCC*, 129 F.3d 625, 630 (D.C. Cir. 1997), both of which granted vacatur under *Munsingwear*. But those cases expressly distinguished the rule of *Bancorp* because it is triggered by voluntary settlement—which wasn't the circumstance in those cases but is precisely Apple's circumstance here. Our conclusion, therefore, is unchanged.

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NEWMAN, *Circuit Judge*, dissenting.

I respectfully dissent. The Federal Circuit is not divested of its statutory jurisdiction to receive appeals of decisions of the Patent Trial and Appeal Board when the parties to an inter partes review have entered into a license agreement. Precedent is clear that a patent licensee may challenge the patent's validity in federal court without loss of Article III standing due to the existence of a license.

In this case the license was for a term of six years, not for the life of the patents. All three patents[1] of these appeals have a longer life span, but Apple states (without contradiction) that Qualcomm refused Apple's

[1] There are three patents and four inter partes review decisions on this consolidated appeal hearing.

request for licenses for the life of the patents. Apple states that there is continuing controversy about validity of the licensed patents, and that denial of standing to appeal the PTAB decisions will subject Apple not only to continuing royalty obligations, but also to the risk of estoppel in any district court proceedings after the license terminates.

Ignoring this continuing controversy, my colleagues on this panel hold that Apple has no standing to appeal these PTAB decisions, despite the statutory authorization for appeal to the Federal Circuit, 35 U.S.C. § 329 and § 141, and despite the statutory estoppel of 35 U.S.C. § 325(e). My colleagues cite a prior opinion of the court on different patents, and hold that Apple's entry into the six-year license eliminated Federal Circuit appellate jurisdiction based on Article III of the Constitution. *See Apple Inc. v. Qualcomm Inc.*, 992 F.3d 1378 (Fed. Cir. 2021) (*Apple I*).

However, a licensee always has standing to challenge validity of the licensed patent; the America Invents Act did not abrogate that right, established in *Lear, Inc. v. Adkins*, 395 U.S. 653 (1969) (overturning licensee estoppel). The AIA further assured that decisions of the PTAB are appealable to the Federal Circuit. There is no qualification as to whether the appellant is a licensee.

The parties hereto recognized in their license agreement that there were ongoing PTAB proceedings that would proceed in conformity with the statute. Nonetheless, the panel majority now holds that Apple has no standing to appeal, and that the Federal Circuit has no jurisdiction, because Apple is a licensee of these patents. Maj. Op. at 6-7. The statutory provision for appeal is contrary:

> **35 U.S.C. § 141—Appeal to Court of Appeals for the Federal Circuit.**
>
> (c) *Post-Grant and Inter Partes Reviews.*—A party to an inter partes review or a post-grant review who is dissatisfied with the final written decision of the Patent Trial and Appeal Board under section 318(a) or 328(a) (as the case may be) may appeal the Board's decision only to the United States Court of Appeals for the Federal Circuit.

This right of appeal is integral to the AIA's post-grant system for determinations of patent validity, for the decision resolves certain validity issues and is binding in the district court and the International Trade Commission; the decision cannot be reviewed in a civil action or by the ITC. These consequences of themselves establish Article III standing. *See Amerigen Pharms. Ltd. v. UCB Pharma GmBH*, 913 F.3d 1076, 1084 (Fed. Cir. 2019) (standing to appeal exists where invalidation of patent would allow petitioner "to launch its competing product substantially earlier than it otherwise could upon the patent's expiration."); the court stated that "'where Congress has accorded a procedural right to a litigant, such as the right to appeal an administrative decision, certain requirements of standing—namely immediacy and redressability, as well as prudential aspects that are not part of Article III—may be relaxed.'" *Id.* at 1082 n.11 (quoting *Consumer Watchdog v. Wis. Alumni Rsch. Found.*, 753 F.3d 1258, 1261 (Fed. Cir. 2014)).

Here, "Congress has accorded a procedural right … to appeal," *id.*, assured in 35 U.S.C. § 141. My colleagues' contrary ruling contravenes the statute. I respectfully dissent.

DISCUSSION

I

The controversy between Apple and Qualcomm is not eliminated by the license grant

Qualcomm argues that there is no Article III controversy because it is "speculative" whether Apple might be infringing these patents when the license expires in 2025. Each of the three patents subject of this appeal is for a different invention, for which Apple products were charged with infringement in district court proceedings. For each patent, Apple then challenged validity in the PTAB based on different combinations of prior art, and each patent received a different analysis and decision. *See* [1] Appeal Case No. 20-1683 (upholding all claims of Patent No. 8,971,861); [2] Case No. 20-1763 (upholding claims 4 and 23 but invalidating claims 1-3, 5, 6, 8-22, 24, 25, 27-30, 46-49, and 51-53 of Patent No. 8,718,865); [3] Case No. 2-1765 (upholding claims 4, 5, 23, 24, and 48 of Patent No. 8,168,865); and [4] Case No. 20-1827 (upholding claims 1, 2, 4, 5, 8, 12, 13, 15-19, and 20, but invalidating claims 3, 9, 10, and 14 of Patent No. 9,024,418).[2]

Each of these appeals presents different issues and arguments and different technologic aspects of the devices that Qualcomm charged with infringement, in a complaint filed in the Southern District of California in

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[2] The '861 patent relates to a method, system and apparatus for monitoring the user's physiological state; Qualcomm accused the Apple Watch and Apple iPhone of infringing this patent. The '865 patent relates to machine learning to correlate certain states of a mobile device; Qualcomm accused Apple's iPhone and iPad of infringing this patent. The '418 patent relates to certain characteristics of cells in circuitry; Qualcomm accused Apple's iPhone of infringing this patent.

2017. *Qualcomm Inc. v. Apple Inc.*, 3-17-CV-02402-WQH-MDD (S.D. Cal. Nov. 29, 2017). Qualcomm focused primarily on the Apple iPhone and the Apple Watch. The license agreement terminated the litigation, but the agreement recognized the ongoing PTAB proceedings, and recited that the inter partes reviews would continue.

Apple reasonably states that the accused products are likely to continue to be in commerce when the license expires in 2025, noting that U.S. Patent No. 8,971,861, for example, does not expire until 2031. Precedent recognizes that such concerns provide standing. *See Medimmune Inc. v. Genentech, Inc.*, 549 U.S. 118, 137 (2007) (patent licensee has standing to challenge validity of licensed patents, without cancelling the license or breaching the license terms). In *Already, LLC v. Nike, Inc.*, 568 U.S. 85 (2013), the Court observed that when litigation is settled between the parties to an infringement suit, the test for Article III controversy is whether the plaintiff "'could not reasonably be expected' to resume its enforcement efforts." *Id.* at 92 (quoting *Friends of the Earth, Inc. v. Laidlaw Env. Servs. (TOC), Inc.*, 528 U.S. 167, 190 (2000)). In *Already v. Nike*, the settlement provided a perpetual release for Nike and its customers, and on that ground was held to end the controversy; in contrast, here Qualcomm refused the requested license for the life of the patents.

The Court in *Lear v. Adkins, supra*, established that a licensee has standing to challenge the patents to which it is licensed, without the need to terminate or breach the license. The Federal Circuit has faithfully implemented this rule; *see, e.g., Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1357 (Fed. Cir. 2020), *cert. denied*, 141 S. Ct. 1376 (2021) ("We determined that the patent

owner's refusal to grant appellant a covenant not to sue further confirmed that appellant's risk of injury was not 'conjectural' or 'hypothetical'") (citing *E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1004–05 (Fed. Cir. 2018)); *JTEKT Corp. v. GKN Auto. LTD.*, 898 F.3d 1217, 1220 (Fed. Cir. 2018) (the reasonable likelihood of future controversy sufficed to satisfy Article III, although the potential infringer "has no product on the market at the present time [this] does not preclude Article III standing, either in IPRs or in declaratory judgment actions."); *Phigenix, Inc. v. Immunogen, Inc.*, 845 F.3d 1168, 1173 (Fed. Cir. 2017) (it suffices under Article III if the challenger is "an actual or prospective licensee of the patent ... ."). In *Powertech Technology Inc. v. Tessera, Inc.*, 660 F.3d 1301 (Fed. Cir. 2011) we explained:

> [Patent owner] appears to maintain that there can be no Article III controversy as long as [licensee] complies with all the terms of the license agreement, including the payment of royalties. In essence, [patent owner's] argument is that [licensee] must breach its license before it can challenge the validity of the underlying patent. This contention, however, is contrary to the Supreme Court's decision in *MedImmune*, in which the Court held that a licensee did not need to repudiate a license agreement by refusing to pay royalties in order to have standing to declare a patent invalid, unenforceable, or not infringed. …

660 F.3d at 1308. *See Baseload Energy, Inc. v. Roberts*, 619 F.3d 1357, 1364 n.5 (Fed. Cir. 2010) ("[T]he license provision of the Settlement Agreement did not bar an invalidity challenge. In both *Lear* and in *MedImmune* … the Supreme Court held that a licensee under

such an agreement may challenge the validity of the patent."); *Prasco, LLC v. Medicis Pharm. Corp.*, 537 F.3d 1329, 1339 (Fed. Cir. 2008) (patentee can cause an injury by, *inter alia*, "demanding the right to royalty payments … .").

Appeals from PTAB decisions are subject to this extensive precedent. In *Altaire Pharmaceuticals, Inc. v. Paragon Bioteck, Inc.*, 889 F.3d 1274, 1282 (Fed. Cir. 2018), *remand order modified by stipulation*, 738 F. App'x 1017 (Fed. Cir. 2018), these principles were applied to PTAB appeals. The court ruled that when a future infringement suit is reasonably likely, the likelihood of such action is of sufficient "immediacy" to support standing to appeal the PTAB decision. 889 F.3d at 1282.

On extensive precedent, it is apparent that a patent licensee has standing to challenge validity of the patents to which it is licensed, including challenge in federal court on appeal from PTO decisions.

Qualcomm argues that because Apple's license is to Qualcomm's entire portfolio, Apple's challenge to a few patents would not relieve Apple of its payment obligation, and thus Apple does not have standing as to these few patents. Apple points out that its concern is with the patents here on appeal, not a portfolio of patents for which no infringement charge has been made. Precedent has considered this argument; *see*, *e.g.*, *Apotex, Inc. v. Daiichi Sankyo, Inc.*, 781 F.3d 1356, 1364-65 (Fed. Cir. 2015) (a licensee has standing to challenge validity even though other barriers to commercial activity remain in place); *Arkema Inc. v. Honeywell Int'l, Inc.*, 706 F.3d 1351, 1358 (Fed. Cir. 2013) (patent owner's refusal to offer a covenant not to sue "suggests that there is an active and substantial controversy between

the parties regarding their legal rights with respect to those patents"). As in *Arkema*, here Qualcomm refused to license Apple for the life of these patents.

The only area in which standing to appeal has occasionally been rejected are cases in which the challenger has no direct or economic interest in the outcome of the appeal. In *Consumer Watchdog*, cited *ante*, this court found no standing to appeal a PTAB decision because the appellant was "a nonprofit consumer rights organization." 753 F.3d at 1263. The court observed that the appellant had "not alleged … that it is an actual or prospective competitor … or licensee of the" patent-in-suit. *Id.* at 1260. Although the Supreme Court had observed in *Sierra Club v. Morton*, 405 U.S. 727, 734–35 (1972) that even a "recreational" or "aesthetic" interest may suffice to establish standing, the Court has considered the particular facts; for example, in *Lujan v. Defenders of Wildlife*, 504 U.S. 555 (1992), the Court held that the asserted injury of being unable to view and study endangered species without concrete plans to do so was not sufficiently "actual or imminent" to establish constitutional standing. *Id.* at 563, 565. Similarly in *Summers v. Earth Island Institute*, 555 U.S. 488 (2009), where a member of the Institute "asserted, first, that he had suffered injury in the past from development on Forest Service land," due to timber sales covered by the challenged regulations, the Court concluded: "That does not suffice [to establish standing] for several reasons: because it was not tied to application of the challenged regulations, because it does not identify any particular site, and because it relates to past injury ra-

ther than imminent future injury that is sought to be enjoined." *Id.* at 495.[3]

The only relevance of these public interest cases to this appeal is that the panel majority and the *Apple I* court rely on them to support its decision of lack of standing. In contrast with non-profit public-interest litigants, Apple's injury is imminent and ongoing. In Apple's words: "There can be no question, then, that Apple is suffering a concrete present harm by having to pay royalties to be free from a patent it believes to be invalid." Case No. 20-1683, Apple Reply Br. 2. This of itself satisfies Article III; *see, e.g.*, *Sanofi-Aventis U.S., LLC v. Dr. Reddy's Labs., Inc.*, 933 F.3d 1367, 1374 (Fed. Cir. 2019) ("In some circumstances, patent claims may create a controversy sufficient for declaratory judgment jurisdiction even when there is no risk of infringement . …").

In sum, the filing of infringement suits by Qualcomm, and the temporary license taken by Apple, support Apple's standing to pursue these appeals, reinforced where, as here "Congress has accorded a procedural right to a litigant, such as a right to appeal an administrative decision … ." *Amerigen Pharms.*, 913 F.3d at 1082 n.11.

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[3] The Court did not foreclose public interest litigation, and in *Defenders of Wildlife*, Justice Stevens observed in concurrence that "we have no license to demean the importance of the interest that particular individuals may have in observing any species or its habitat, whether those individuals are motivated by esthetic enjoyment, an interest in professional research, or an economic interest in preservation of the species. Indeed, this Court has often held that injuries to such interests are sufficient to confer standing, and the Court reiterates that holding today." 504 U.S. at 582 (citation omitted).

II

The special statutory estoppel of PTAB decisions reinforces the right of appeal

The statutory estoppel of post-grant decisions is integral to the America Invents Act's purpose of expeditious and economical final resolution of certain validity issues:

> **35 U.S.C. § 325(e) – Estoppel.**
>
> (2) *Civil actions and other proceedings*.—The petitioner in a post-grant review of a claim in a patent under this chapter that results in a final written decision under section 328(a), ... may not assert either in a civil action arising in whole or in part under section 1338 of title 28 or in a proceeding before the International Trade Commission under section 337 of the Tariff Act of 1930 that the claim is invalid on any ground that the petitioner raised or reasonably could have raised during that post-grant review.

This estoppel provision is a novel change from previous validity procedures. As stated in *PPG Industries, Inc. v. Valspar Sourcing, Inc.*, 679 F. App'x 1002, 1005 (Fed. Cir. 2017), the appellant's "stake is enhanced by the 'estoppel provisions contained within the inter partes reexamination statute.'" (quoting *Consumer Watchdog*, 753 F.3d at 1262). It cannot have been the legislative intent that a PTAB decision would achieve estoppel in district court if appeal of that decision were barred. Rather, the statutory structure includes appeal of the PTAB decisions to the Federal Circuit, as codified at 35 U.S.C. § 329 and § 141.

Apple was sued for infringement, leading to this six-year license. This unresolved controversy of itself

suffices to establish standing to challenge validity of the licensed patents, for Apple's "risk of liability is not 'conjectural' or 'hypothetical.'" *See Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1357 (Fed. Cir. 2020), *cert. denied*, 141 S. Ct. 1376 (2021) ("In *Dupont* … [w]e determined that the patent owner's refusal to grant appellant a covenant not to sue further confirmed that appellant's risk of injury was not 'conjectural' or 'hypothetical'") (citing *E.I. DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1005 (Fed. Cir. 2018)); *Gen. Elec. Co. v. Raytheon Techs. Corp.*, 983 F.3d 1334, 1342 (Fed. Cir. 2020) (finding standing where challenger's "specific investment in continued development of a geared turbofan engine design, its avowed preference to offer this design for sale, and its informal offer of this engine to [patentee] in an ongoing bidding process together establish that [challenger] will *likely* engage in the sale of this geared turbofan engine design to customers.") (emphasis in original).

The estoppel provision of itself provides Apple with standing to appeal the PTAB decisions, and provides this court with jurisdiction to receive the appeals. Constitutional considerations were recognized in the America Invents Act, and are reflected in the provisions for judicial review. In addition, there is a "strong presumption that Congress intends judicial review of administrative action." *Bowen v. Michigan Acad. of Fam. Physicians*, 476 U.S. 667, 670 (1986). *See Smith v. Berryhill*, 139 S. Ct. 1765, 1777 (2019) ("[T]he burden for rebutting" the presumption of judicial review "is 'heavy' … ") (quoting *Mach Mining, LLC v. EEOC*, 135 S. Ct. 1645, 1651 (2015)). Judicial review is part of Patent Office history, and is fundamental to the new procedures created by the America Invents Act:

> **35 U.S.C. § 329—Appeal**. A party dissatisfied with the final written decision of the Patent Trial and Appeal Board under section 328(a) may appeal the decision pursuant to sections 141 through 144. Any party to the post-grant review shall have the right to be a party to the appeal.

This statutory provision is not negated when the appellant is also a licensee. The legislative record shows that appellate procedures for the AIA were considered; the Senate record refers to the direct appeal to the Federal Circuit as part of the new inter partes review process:

> The bill also eliminates intermediate administrative appeals of inter partes proceedings to the BPAI, instead allowing parties to only appeal directly to the Federal Circuit. By reducing two levels of appeal to just one, this change will substantially accelerate the resolution of inter partes cases.

157 Cong. Rec. S1376 (daily ed. Mar. 8, 2011) (statement of Sen. Schumer). *See also* H.R. Rep. 112-98 pt. 1 at 47 ("Inter partes reviews will be conducted before a panel of three APJs. Decisions will be appealed directly to the Federal Circuit.").

Federal Circuit review is an integral component of the new post-grant procedures. It does not violate the Constitution when the appellant is a licensee of the patent being reviewed.

III

Vacatur of the PTAB decision is appropriate if appeal is deemed barred by the Constitution

The Court recently reviewed the status of PTAB decisions under the Appointments Clause, *see United States v. Arthrex, Inc.*, 141 S. Ct. 1970 (2021), and concluded that PTAB decisions must be amenable to review by a principal agency officer, or the decisions must be vacated. On similar principles, if PTO decisions are denied the right of judicial review, they must be vacated.

The Court has approved vacatur in analogous circumstances of unreviewed agency action, *see A.L. Mechling Barge Lines, Inc. v. United States*, 368 U.S. 324, 329 (1961) (vacatur for mootness is "applicable to unreviewed administrative orders"); *see also PNC Bank Nat'l Ass'n v. Secure Axcess, LLC*, 138 S. Ct. 1982 (mem.) (2018) (the Court ordered vacatur of PTAB decision of invalidity as moot because patent owner dismissed its infringement suit with prejudice (citing *United States v. Munsingwear, Inc.*, 340 U.S. 36 (1950)).

The Federal Circuit has vacated PTAB decisions for various reasons; *see, e.g. Valspar Sourcing, Inc. v. PPG Indus., Inc.*, 780 F. App'x 917, 921 (Fed. Cir. 2019) (vacating PTAB decision and rejecting the proposition that a party "'should suffer the consequences' of its choice to unilaterally moot the original appeal" by "leaving in place certain adverse determinations from the proceedings below"). The court explained that "*Munsingwear* and its progeny instruct us to prevent appellants from being forced to acquiesce in a judgment that they can no longer challenge on the merits. They further instruct us to protect all parties from the collat-

eral effects of a case that is mooted before an appellate determination on the merits." *Id.* Similarly here, Apple should not be subject to estoppel if it is prevented from challenging the PTAB decision on the merits.

The panel majority proposes that Apple "forfeited" the right to appeal to the Federal Circuit and forfeited access to vacatur of the PTAB decision. Maj. Op. at 8. The record contains no action or inaction by Apple suggestive of forfeiture. To the contrary, these four cases are Apple's statutory appeals from the PTAB decisions, and *Munsingwear* instructs that parties should not be "forced to acquiesce in a judgment that they can no longer challenge on the merits." *Valspar*, 780 F. App'x at 921 (citing *Munsingwear*, 340 U.S. at 39-41). Apple duly filed these appeals of the PTAB's decisions. If the appeals are now deemed barred, the PTAB decisions are appropriately vacated.

CONCLUSION

Apple has standing to appeal these PTAB decisions to the Federal Circuit, and the Federal Circuit has jurisdiction to receive and decide these appeals. If appeal is nonetheless denied, the PTAB decisions require vacatur. From my colleagues' contrary rulings, I respectfully dissent.

APPENDIX B

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

IPR2018-01276
Patent 8,971,861 B2

APPLE INC.,
Petitioner,
v.

QUALCOMM INCORPORATED,
Patent Owner.

PAPER NO. 32
ENTERED: FEBRUARY 3, 2020

Before
MICHELLE N. WORMMEESTER,
AMANDA F. WIEKER, and SCOTT B. HOWARD,
Administrative Patent Judges.
WIEKER, *Administrative Patent Judge.*

JUDGMENT
FINAL WRITTEN DECISION
Determining No Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background

Apple Inc. ("Petitioner") filed a Petition requesting an *inter partes* review of claims 1-34 ("challenged claims") of U.S. Patent No. 8,971,861 B2 (Ex. 1001, "the '861 patent"). Paper 2 ("Pet."). Qualcomm Incorporated ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). We instituted an *inter partes* review of challenged claims 1-34 on all five grounds of unpatentability presented in the Petition, pursuant to 35 U.S.C. § 314. Paper 7 ("Inst. Dec.").

After institution, Patent Owner filed a Response (Paper 17, "PO Resp."), Petitioner filed a Reply (Paper 21, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 23, "PO Sur-reply"). An oral hearing was held on November 14, 2019, and a transcript of the hearing is included in the record. Paper 31 ("Tr.").

We issue this Final Written Decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons set forth below, Petitioner has not shown by a preponderance of the evidence that challenged claims 1-34 of the '861 patent are unpatentable.

B. Related Proceeding

The parties identify the following matter related to the '861 patent (Pet. 66-67; Paper 4, 1; Paper 15, 1):

Qualcomm Inc. v. Apple Inc., 3:17-cv-2402 (S.D. Cal.) (dismissed).

C. The '861 Patent

The '861 patent, titled "Relevant Content Delivery," issued on March 3, 2015, from U.S. Application

No. 13/863,714, filed April 16, 2013. Ex. 1001, codes (21), (22), (45), (54).

According to the '861 patent, "[t]he more relevant content is to a user, the more likely the user may be to interact with the content." *Id.* at 6:21-22. Thus, the '861 patent discloses a method and system for delivering relevant content to a user. *Id.* at code (57).

The '861 patent discloses that a user's "mobile device, such as a cellular phone, can collect environmental data and physiological state data of the user to assist in providing relevant content, such as advertisements, recommendations, and applications to a user of the mobile device." *Id.* at 6:35-39. Examples of "environmental data" include "the location of the mobile device, motion of the mobile device (e.g., speed and patterns), the temperature of the mobile device, objects in the vicinity of the mobile device, etc." *Id.* at 6:52-55. Examples of "physiological state data" include "heart rate data, heart rate variability data, skin conductance level data, number of electrodermal responses data, or change in skin temperature." *Id.* at 2:51-54.

Figure 4 of the '861 patent is reproduced below.

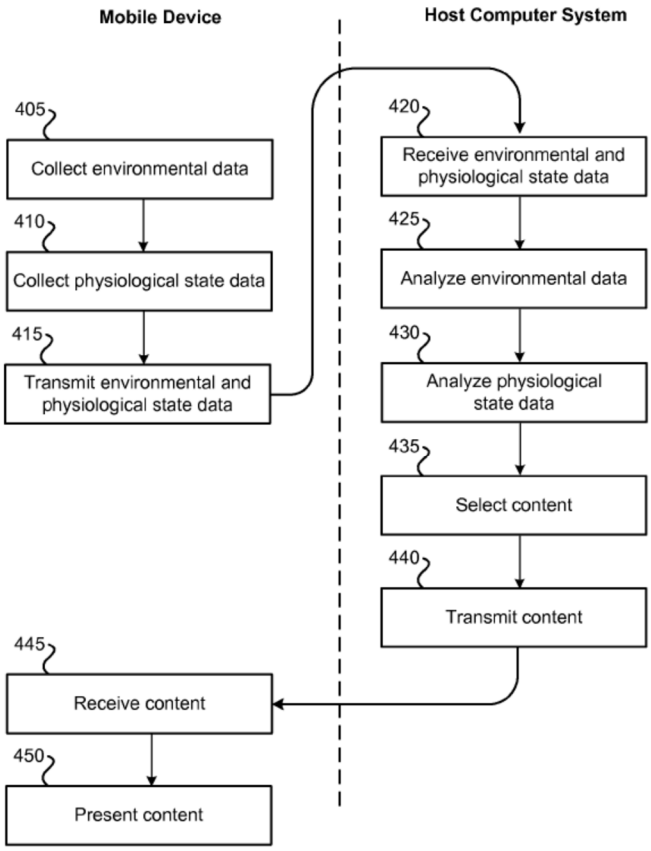

FIG. 4

Figure 4 is a flow-chart depicting a method for delivering relevant content to a mobile device. *Id.* at 6:7-8. As shown in Figure 4, a mobile device collects environmental and physiological state data through various sensors (steps 405, 410). *Id.* at 14:41-65 (e.g., a positioning (GPS) sensor and an electrocardiogram (ECG) sensor); *see also* Fig. 1 (sensors 112, 114). This data is transmitted to a host computer system (step 415). *Id.* at 14:66-15:5; *see also id.* at Fig. 1 (computer 140).

Once the data is received at the host computer (step 420), it is analyzed (step 425). *Id.* at 15:6-39 (e.g., identifying objects within an image, interpreting accelerometer data, or determining user activity). The results of this analysis may be used to select relevant content for delivery to the mobile device (step 435). *Id.* at 15:40-52 (content is relevant when, e.g., "the content in the content database is similar to the analyzed data"); *see also id.* at Fig. 3A-3C (depicting entries in a content database, from which relevant content is selected). The selected content is transmitted to, and received by, the mobile device (steps 440, 445), and presented to the user (step 450). *Id.* at 15:51-65 (e.g., displaying text or playing audio); *see also id.* at 7:5-22 (presenting advertisements for various drinks, e.g., a sports drink, an energy drink, or a soft drink, depending upon the user's physiological state, e.g., engaging in physical activity, tired, or normal).

D. Illustrative Claims

The '861 patent includes 34 claims, all of which are challenged. Claims 1, 10, 19, and 26 are independent claims. Claims 1 and 26 are illustrative and are reproduced below.

> 1. A method for selecting content for delivery, the method comprising:
>
> receiving, by a host computer system, from a mobile device, physiological state data collected from a user of the mobile device;
>
> analyzing, by the host computer system, the physiological state data collected from the user of the mobile device;
>
> selecting, by the host computer system, content from a plurality of predefined content to deliver to

the mobile device at least partially based on the physiological state data collected from the user, the selected content not including the physiological state data collected from the user; and

transmitting, by the host computer system, the selected content to the mobile device.

26. An apparatus for selecting content for delivery, the apparatus comprising:

means for receiving, from a mobile device, physiological state data collected from a user of the mobile device;

means for analyzing the physiological state data collected from the user of the mobile device;

means for selecting content from a plurality of predefined content to deliver to the mobile device at least partially based on the physiological state data collected from the user, the selected content not including the physiological state data collected from the user; and

means for transmitting the selected content to the mobile device.

Ex. 1001, 24:6-20, 27:13-25. Independent claims 10 and 19 recite a "system" and a "non-transitory processor-readable medium," respectively, with similar limitations as those recited in claim 1. *Id.* at 25:9-29, 26:21-34.

E. Applied References

Petitioner relies upon the following references (Pet. 2):

Hoffman et al., U.S. Patent Application Publication No. 2012/0041767, filed August 11, 2010, published February 16, 2012 (Ex. 1004, "Hoffman");

Morris et al., U.S. Patent No. 7,962,604 B1, filed October 17, 2000, issued June 14, 2011 (Ex. 1005, "Morris");

Lundqvist et al., U.S. Patent Application Publication No. 2010/0179865 A1, filed January 9, 2009, published July 15, 2010 (Ex. 1006, "Lundqvist");

Lin et al., U.S. Patent Application Publication No. 2010/0125492 A1, filed November 14, 2008, published May 20, 2010 (Ex. 1007, "Lin");

Hjelt et al., U.S. Patent No. 7,278,966 B2, filed May 25, 2004, issued October 9, 2007 (Ex. 1008, "Hjelt"); and

Kurtz et al., U.S. Patent Application Publication No. 2008/0292151 A1, filed May 22, 2007, published November 27, 2008 (Ex. 1009, "Kurtz").

Petitioner relies upon the Declaration of Dr. Brian Anthony (Ex. 1003) and Patent Owner relies upon the Declaration of Dr. John Villasenor (Ex. 2003). The parties also rely upon the July 12, 2018, deposition of Dr. Villasenor (Ex. 1026), from the related litigation (*see supra* I.B); the July 26, 2019, deposition of Dr. Villasenor (Ex. 1028); and the May 7, 2019, deposition of Dr. Anthony (Ex. 2002).

F. Asserted Grounds of Unpatentability

We instituted an *inter partes* review based on the following grounds. Inst. Dec. 8, 40.

Reference(s)	Basis	Claims Challenged
Hoffman	§§ 102/103	1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30
Hoffman, Morris, Lundqvist	§ 103	6, 15, 31
Hoffman, Lin	§ 103	7-9, 16-18, 23-25, 32-34
Hjelt	§§ 102/103	1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30
Hjelt, Kurtz	§ 103	2, 11, 20, 27

II. DISCUSSION

A. Claim Construction

For petitions filed before November 13, 2018, such as this one, we interpret the claims of an unexpired patent that will not expire before issuance of a final written decision using the broadest reasonable interpretation in light of the specification. 37 C.F.R. § 42.100(b) (2017); *see also* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (codified at 37 C.F.R. § 100(b) (2019)). "Under a broadest reasonable interpretation, words of the claim must be given their plain meaning, unless such meaning is inconsistent with the specification and prosecution history." *Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1062 (Fed. Cir. 2016).

Claim limitations that include the terms "means" or "means for" are presumed to invoke 35 U.S.C. § 112 ¶ 6. *See Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1348 (Fed. Cir. 2015) (en banc in relevant part). Claims

subject to 35 U.S.C. § 112 ¶ 6 are construed in a "two-step process," whereby we "first identify the claimed function," and then "determine what structure, if any, disclosed in the specification corresponds to the claimed function." *Id.* at 1351. Accordingly, the rules governing this *inter partes* review require that Petitioner "identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function." 37 C.F.R. § 42.104(b)(3).

It is well established that "the corresponding structure for a § 112 ¶ 6 claim for a computer-implemented function is the algorithm disclosed in the specification." *Aristocrat Techs. Austl. Pty Ltd. vs. Int'l Game Tech.*, 521 F.3d 1328, 1333 (Fed. Cir. 2008) (quoting *Harris Corp. v. Ericsson Inc.*, 417 F.3d 1241, 1249 (Fed. Cir. 2005)); *see also EON Corp. IP Holdings, LLC v. AT&T Mobility LLC*, 785 F.3d 616, 623 (Fed. Cir. 2015) ("A microprocessor or general purpose computer lends sufficient structure only to basic functions of a microprocessor. All other computer implemented functions require disclosure of an algorithm.").

1. "physiological state data" and "environmental data"

In our Institution Decision, we preliminarily construed "physiological state data," which appears in independent claims 1, 10, 19, and 26, as "data about the user's physical condition," consistent with Petitioner's proposal and the intrinsic record. Inst. Dec. 9-10; Pet. 5-6. We also preliminarily construed "environmental data," which appears in dependent claims 3, 4, 12, 13, 21, 22, 28, and 29, as "data about the environment," consistent with Patent Owner's arguments and the intrinsic record. Inst. Dec. 9-10; Prelim. Resp. 12-14. In their post-institution papers, neither party disputes these constructions. PO Resp. 13-15; Tr. 27:9-17. For

the reasons below, we maintain our constructions from the Institution Decision.

The '861 patent Specification defines "physiological state data" as "data about the user's physical condition." Ex. 1001, 7:54-55. The '861 patent provides several examples of such data, e.g., "heart rate data, heart rate variability data, skin conductance level data, number of electrodermal responses data, or change in skin temperature," and discloses various sensors for capturing this data. *Id.* at 2:51-60, 7:55-60. Accordingly, the intrinsic record confirms our construction of "physiological state data" as "data about the user's physical condition."

The '861 patent Specification describes "environmental data" as including data about the environment, for example, "the location of the mobile device, motion of the mobile device (e.g., speed and patterns), the temperature of the mobile device, objects in the vicinity of the mobile device, etc." *Id.* at 6:52-55. The '861 patent also discloses various sensors and devices for capturing this data. *Id.* at 6:55-57 (camera), 7:23-26 (accelerometer or gyroscope), 7:31-32 (GPS receiver), 9:50 (magnetometer). Accordingly, the intrinsic record confirms our construction of "environmental data" as "data about the environment."

Additionally, the '861 patent Specification and claims confirm that "environmental data" and "physiological state data" have different meanings. Indeed, the claims recite these phrases separately. "Where a claim lists elements separately, 'the clear implication of the claim language' is that those elements are 'distinct component[s]' of the patented invention." *Becton, Dickinson & Co. v. Tyco Healthcare Group, LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010). Accordingly, the in-

trinsic record confirms our construction of these phrases as encompassing different types of data.

2. "a plurality of predefined content"

In our Institution Decision, we preliminarily construed "a plurality of predefined content," which appears in independent claims 1, 10, 19, and 26, as "multiple content items that exist prior to receiving the physiological state data," consistent with the intrinsic record and the positions taken by the parties in related litigation. Inst. Dec. 10-12; Prelim Resp. 14; Ex. 2001, 21 (Ex. A at 5). In their post-institution papers, neither party disputes this construction. PO Resp. 15-16; *see*, *e.g.*, Pet. Reply 2, 6. For the reasons below, we maintain our construction from the Institution Decision.

The parties' positions taken in district court litigation are consistent with our preliminary construction.[1] For example, Petitioner proposed that this phrase be construed as "[m]ultiple content items that are fixed or determined prior to receiving the physiological state data or environmental data from the mobile device." Ex. 2001 at 21 (Ex. A at 5). Similarly, Patent Owner proposed that this phrase be construed as "multiple content items existing prior to reception of the physiological state data." *Id.* Both proposed constructions require that the predefined content exists prior to receiving at least "the physiological state data."

The '861 patent Specification does not use the phrase "a plurality of predefined content." However, the '861 patent explains that content may be stored in a database, such as content database 150-2, shown in Figure 1. Ex. 1001, 9:39-43, Fig. 1 (also depicting user

[1] The district court did not issue a claim construction order before the case was terminated. Tr. 36:22-37:3.

database 150-1, pricing database 150-3). "Content database 150-2 may contain the content that host computer system 140 has available to deliver to mobile devices, such as mobile device 110. Content in content database 150-2 may be textual, graphic, and/or auditory." *Id.* at 10:48-57. According to the '861 patent, this content database "may be searched to identify content that most closely relates to the analyzed environmental and physiological state data. … If relevant content is identified … the content may be transmitted to the mobile device." *Id.* at 15:40-52; *see also id.* 6:30-42, 19:44-48. Thus, the '861 patent explains that searchable content exists in a database *prior to receiving* physiological state data and/or environmental data, for comparison.[2]

Accordingly, the intrinsic record confirms our construction of "a plurality of predefined content" as "multiple content items that exist prior to receiving the physiological state data."

3. Means-Plus-Function Limitations in Claims 26-34

Independent claim 26 recites several limitations that utilize the phrase "means for," presumptively invoking 35 U.S.C. § 112 ¶ 6. *Williamson*, 792 F.3d at 1348. For example, claim 26 recites "means for receiving … physiological state data …," "means for analyzing the physiological state data …," "means for selecting content from a plurality of predefined content …," and "means for transmitting the selected content … ." Ex. 1001, 27:13-25. Dependent claims 27, 28, 30, 31, and

[2] Although the patent discusses searching the stored content against received environmental and/or physiological state data, the challenged independent claims do not recite environmental data and, as such, environmental data is not included in our construction of this phrase.

32 include eight additional means-plus-function limitations. *See id.* at 27:26-28:36. 37 C.F.R. § 42.104(b)(3) requires that, for each means-plus-function limitation, "the petition must … identify the specific portions of the specification that describe the structure, material, or acts corresponding to each claimed function."

As noted above, "the corresponding structure … for a computer-implemented function is the algorithm disclosed in the specification." *Aristocrat*, 521 F.3d 1333. In our Institution Decision, we preliminarily found that the Petition had not identified sufficient corresponding structure for the means-plus-function limitations recited in claims 26-34 because Petitioner had not identified algorithms for performing the recited functions. Inst. Dec. 14-15. As a consequence, we preliminarily found that Petitioner also failed to demonstrate that the prior art satisfied the claim limitations because Petitioner failed to show the existence of the corresponding structure—i.e., the disclosed algorithms—in the prior art. *Id.* at 28-29, 37-38; *Fresenius USA, Inc. v. Baxter Int'l, Inc.*, 582 F.3d 1288, 1299-1300 (Fed. Cir. 2009) (challenger "must prove that the corresponding structure—or an equivalent—was present in the prior art").

In its Response, Patent Owner agrees with the Board that Petitioner failed to identify corresponding algorithms and, consequently, "failed to perform the correct analysis against the disclosures of Hoffman, Hjelt, or the other prior art." PO Resp. 16-19. Additionally, Patent Owner identifies what it alleges to be algorithms corresponding to certain means-plus-function limitations. *Id.* at 19-23. For example, Patent Owner contends that the algorithm disclosed in the '861 patent for performing the function associated with the "means for analyzing the physiological state data …" is

found "at step 430 of Figure 4, step 535 of Figure 5, or step 640 of Figure 6 and described in the Specification at 15:13-39, 17:7-11, or 19:15-41." *Id.* at 19 (citing Ex. 1001, 15:13-24 ("'using the physiological state data to identify a likely physiological state of the user,' and may also include identifying an intensity level"); Ex. 2003 ¶¶ 42-45).[3]

Petitioner acknowledges that an algorithm is required for many of the means-plus-function limitations of claims 26-34. Pet. Reply 14; Tr. 16:11-13. In the Reply and at the oral argument, Petitioner argues that the Petition's identification of "computer components from the specification," coupled with a string citation to portions of the '861 patent specification, is sufficient to comply with 37 C.F.R. § 42.104(b)(3). Pet. Reply 8; Tr. 15:15-16:20.[4] Petitioner also argues that because Petitioner put forth a string citation to the patent Specification, *the Board* should have reviewed those citations to identify and articulate the algorithms that correspond to the claimed functions, and to determine whether those algorithms are present in the asserted prior art. Tr. 15:15-16:20.

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[3] The Response indicates that the parties agreed, in district court, that the corresponding structure for the "means for receiving, from a mobile device, physiological state data" is "communications subsystem 830 of computer system 140/800," and equivalents. PO Resp. 16 n.1 (citing Ex. 2001, 55). Patent Owner's counsel represents the parties' agreement that communications subsystem 830 is a "specific structure," obviating the need for an algorithm. Tr. 37:5-22. We need not resolve that issue. We focus our analysis on other means-plus-function limitations, as discussed herein.

[4] Petitioner's additional contentions regarding these limitations, and Patent Owner's Sur-reply arguments, are discussed below. Pet. Reply 8-15; PO Sur-reply 3-5; *see infra* II.D.3, II.F.3.

Our rule 37 C.F.R. § 42.104(b)(3) requires that *the petition* identify the corresponding structure for each means-plus-function limitation. Considering, for example, the "means for analyzing the physiological state data," the Petition identified the corresponding structure[5] as "host computer system 140 and a computer system 800 containing one or more processors, storage devices, input devices, output devices, communications subsystems, and memory" and cited the following portions of the '861 patent Specification: Ex. 1001, 10:15-33, 15:1-7, 15:13-39, 17:7-11, 19:15-41, and Figures 4-6. Pet. 7-8 (internal quotations omitted) (identifying the same structure for "means for selecting content …").

However, the structure identified by Petitioner consists entirely of general-purpose computer components, i.e., host computer system 140, computer system 800, and various general-purpose components like processors and memory. *Id.* at 7. This structure does not provide *any* algorithmic detail about how the recited function is accomplished. In particular, Petitioner does not show how host computer system 140, computer system 800, and/or the identified general-purpose computer components actually "analyz[e] the physiological state data collected from a user of the mobile device," without some type of special programming. *See EON Corp.*, 785 F.3d at 623 ("A microprocessor or general purpose computer lends sufficient structure only to basic functions of a microprocessor. All other computer implemented functions require disclosure of an algorithm."); *Finisar Corp. v. DirecTV Grp., Inc.*, 523 F.3d 1323, 1340-41 (Fed. Cir. 2008) ("Simply reciting 'soft-

[5] The parties agree the function is "analyzing the physiological state data collected from a user of the mobile device." Pet. 7; PO Resp. 19 ("*the* user").

ware' without providing some detail about the means to accomplish the function is not enough."); *see also Blackboard, Inc. v. Desire2Learn, Inc.*, 574 F.3d 1371, 1382 (Fed. Cir. 2009).

An algorithm may be expressed in "any understandable terms including as a mathematical formula, in prose, or as a flow chart, or in any other manner that provides sufficient structure." *Finisar*, 523 F.3d at 1340. We do not agree, however, with Petitioner's contention that the Board should have discerned an algorithm on its own, from portions of the Specification offered in a string citation in the Petition. It is plainly Petitioner's burden—not the Board's—to make such an identification. 37 C.F.R. § 42.104(b)(3).

Moreover, a string citation lacking any explanation whatsoever is imprecise and vague. For example, Petitioner's citation to Figures 4-6 directs us to three flowcharts depicting three embodiments for performing the *entire claimed invention*, with 38 individual steps. Pet. 7; Ex. 1001, 6:7-14. It is unclear what algorithm should be divined from these figures. And although Petitioner's citations to other portions of the Specification (Pet. 7 (citing Ex. 1001, 10:15-33, 15:1-7, 15:13-39, 17:7-11, 19:15-41)) are more specific than its blanket citation to three figures, they are presented without explanation or further direction indicating what Petitioner regards as a corresponding algorithm. "Judges are not like pigs, hunting for truffles buried in briefs"; nor will we hunt for truffles buried in string citations, offered in briefs. *Anderson v. Eppstein*, 59 USPQ2d 1280, 1287 (BPAI 2001) (citing *United States v. Dunkel*, 927 F.2d 955, 956 (7th Cir. 1991)).

Moreover, as discussed in detail below, *see infra* III.D.3 and III.F.3, *even if* the Board identified an algo-

rithm contained within the cited portions of the Specification, it is unclear how *the Petition* could have mapped the prior art to that previously unidentified algorithmic structure, given that the Petition itself did not identify the algorithm. *See* Tr. 16:21-17:7 (arguing that the Petition mapped the prior art to the claims "in the functional sense"); but *see Fresenius*, 582 F.3d at 1299 ("It is firmly established … that a structural analysis is required … [and] a functional analysis alone will not suffice.").

Accordingly, we maintain our finding that the Petition fails to identify sufficient corresponding structure, including an algorithm, for means-plus-function limitations recited in, *inter alia*, independent claim 26, including "means for analyzing the physiological state data" and "means for selecting content." Inst. Dec. 15.

B. Principles of Law

A claim is unpatentable under 35 U.S.C. § 102 if a prior art reference discloses every limitation of the claimed invention, either explicitly or inherently. *Glaxo Inc. v. Novopharm Ltd.*, 52 F.3d 1043, 1047 (Fed. Cir.1995). To establish inherency, the extrinsic evidence "must make clear that the missing descriptive matter is necessarily present" in the single anticipating reference. *Continental Can Co. v. Monsanto Co.*, 948 F.2d 1264, 1268 (Fed. Cir. 1991).

A claim is unpatentable under 35 U.S.C. § 103(a) if "the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of

underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness.[6] *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). When evaluating a combination of teachings, we must also "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)). Whether a combination of elements would have produced a predictable result weighs in the ultimate determination of obviousness. *Id.* at 416-417.

"Both anticipation under § 102 and obviousness under § 103 are two-step inquiries. The first step in both analyses is a proper construction of the claims. … The second step in the analyses requires a comparison of the properly construed claim to the prior art." *Medichem, S.A. v. Rolabo, S.L.*, 353 F.3d 928, 933 (Fed. Cir. 2003) (internal citations omitted). In the context of claims that invoke 35 U.S.C. § 112 ¶ 6, "a challenger who seeks to demonstrate that a means-plus-function limitation was present in the prior art must prove that the corresponding structure—or an equivalent—was present in the prior art." *Fresenius*, 582 F.3d at 1299-1300. "It is firmly established … that a structural analysis is required … [and] a functional analysis alone will not suffice." *Id.*

In an *inter partes* review, the petitioner must show with particularity why each challenged claim is un-

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[6] Patent Owner does not identify any objective evidence of nonobviousness in this case.

patentable. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016); 37 C.F.R. § 42.104(b) (2019). The burden of persuasion never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). To prevail, Petitioner must support its challenge by a preponderance of the evidence. 35 U.S.C. § 316(e) (2012); 37 C.F.R. § 42.1(d) (2019).

We analyze the challenges presented in the Petition in accordance with the above-stated principles.

C. Level of Ordinary Skill in the Art

In our Institution Decision, we adopted the assessment of the level of ordinary skill in the art, offered by Petitioner, such that a person of ordinary skill in the art:

> would have had a Bachelor of Science degree in an academic discipline emphasizing the design of electrical, computer, or software technologies, in combination with training or at least one to two years of related work experience with capture, processing and transmission of data or information, including but not limited to physiological monitoring technologies, or a Master of Science degree in the same discipline.

Pet. 4-5 (citing Ex. 1003 ¶ 15); Inst. Dec. 17-18.

Patent Owner offers a slightly different assessment of the appropriate skill level (PO Resp. 23), but states that "the differences between the Board's definition of level of skill in the art and Patent Owner's definition [are] not significant." *Id.* at 23-24 (identifying the skill level as "a bachelor's of science degree in electrical engineering, computer science, computer engineering, or a closely-related field, and at least two years of work or

research experience in the field of content delivery to a mobile device or a closely related field") (citing Ex. 2003 ¶¶ 25, 29).

Accordingly, we apply the assessment offered by Petitioner and applied in our Institution Decision, which is supported by evidence of record. Pet. 4-5; Inst. Dec. 17-18; Ex. 1003 ¶ 15; Ex. 2005 ¶ 29.

D. Anticipation by or Obviousness over Hoffman

Petitioner contends that claims 1, 3-5, 10, 12-14, 19, 21, 22, 26, and 28-30 of the '861 patent are unpatentable as anticipated by and/or obvious over Hoffman. Pet. 12-32. Patent Owner opposes. PO Resp. 25-43.

1. Overview of Hoffman (Ex. 1004)

Hoffman is titled "Athletic Activity User Experience and Environment." Ex. 1004, code (54). Hoffman discloses that "the invention relate[s] to the measurement, collection, display and management of athletic and non-athletic information. … Typically, an athletic information monitoring device will incorporate a sensor for measuring parameters relating to the person being monitored, and a computing device for processing the parameters measured by the sensor." *Id.* ¶ 26.

Hoffman discloses computer 101, which may connect to, e.g., a mobile device, such as a digital music player or a smartphone. *Id.* ¶¶ 30, 33-34, Figs. 1-2. Hoffman also discloses athletic information monitoring device 201, which includes digital music player 203, interface device 205, and athletic parameter measurement device 207, with sensors 301A–B. *Id.* ¶¶ 37-38 (e.g., speed or distance sensors 301), 48 (heart rate measurement device 207), Figs. 2-4. In operation, interface device 205 obtains processed information from measurement device 207, optionally processes it fur-

ther, and provides it to digital music player 203 for storage and/or download. *Id.* ¶¶ 37, 39-40, 43. Hoffman also discloses collection and display device 501, which receives data from monitoring device 201 and transmits it to display and configuration device 601, which may store and/or configure that data for display. *Id.* ¶¶ 51-57, 58-61 (describing the display process), Figs. 5-6.

Additionally, in Figures 7A and 7B, Hoffman discloses athletic activity monitoring watch 10, which includes an accelerometer and/or GPS receiver, and which communicates with various sensors, e.g., heart rate or shoe sensors (including those "within other devices such as device 201 of FIG. 2"). *Id.* ¶¶ 62-64.

Hoffman also discloses "computing environments through which both athletic and non-athletic activities may be monitored, collected, stored, analyzed and rewarded." *Id.* ¶ 69. Figure 8A is reproduced below.

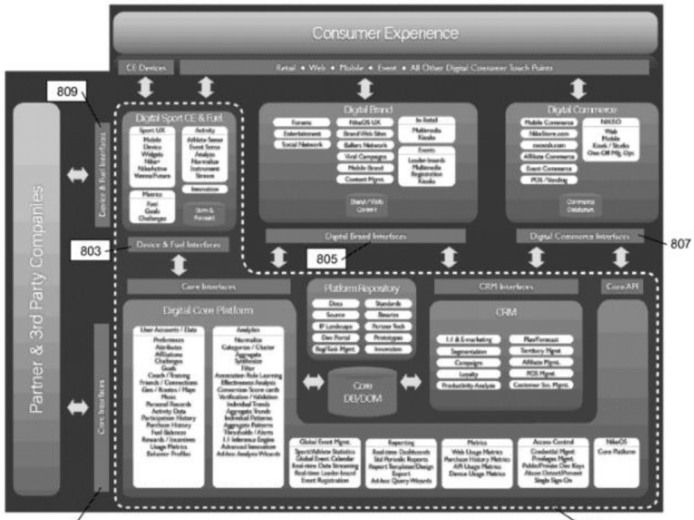

FIG. 8A

Figure 8A depicts "athletic activity monitoring system [801] and engines thereof that may be used in an athlet-

ic activity monitoring environment." *Id.* ¶ 17. Athletic performance monitoring system 801 tracks and monitors athletic performance and other activity, e.g., online browsing and shopping preferences. *Id.* ¶ 69. This information may be analyzed "to better customize the user's experience with system 801 and/or the services provided thereby." *Id.*

Figure 8A also depicts "interfaces 803 that allow remote devices (e.g., watch 10 of FIGS. 7A and 7B) to submit and receive information"—for example, detected athletic activity may be transmitted from watch 10 to system 801, for analysis and storage. *Id.* ¶ 70. Hoffman explains that "[s]ystem 801 may further interface with various sources of information. … For example, system 801 may submit content such as articles, posts in forums, [etc.] … to other sites or systems through interfaces 805." *Id.* Additionally, "system 801 may include digital commerce interfaces 807 that provide an outlet for consumers to purchase products and services" offered by companies sponsoring the services provided by system 801. *Id.* Furthermore, "[s]ystem 801 may further allow partner and third party entities to interface with system 801 to provide additional products or services that leverage and/or interoperate with the features offered by system 801 through interfaces 809." *Id.* ¶ 71. "For example, tennis balls may include sensors to detect a force of a user's stroke. Such information may be transmitted from the tennis ball to another device or to system 801 for analysis, storage and/or monitoring." *Id.*

Hoffman also explains that system 801 may include a marketing engine that leverages collected activity information "to determine what information to display to users and what products or services to advertise." *Id.* ¶ 72. "For example, if a user frequently plays basket-

ball and purchases basketball related equipment, a service may be able to better target the user with advertisements that relate to basketball events, sales and products." *Id.* Hoffman discloses additional analytical engines that process athletic activity information, shopping behavior, and/or browsing trends "to customize the user experience." *Id.* ¶ 73. With reference to Figure 8B, Hoffman discloses that engine 810 collects "eCommerce data, event participation data, workout information, music selection information and the like to produce insights into various aspects of the user," which are used to "customize … a user's experience using system 801 including suggesting various products (or a color scheme thereof), services, events and the like for the user," or by "prioritiz[ing]" relevant information "for display to the user based on the user profile." *Id.*

2. Independent Claims 1, 10, and 19

Independent claim 1 recites, *inter alia*, "selecting, by the host computer system, content … to deliver to the mobile device at least partially based on the physiological state data … and transmitting, by the host computer system, the selected content to the mobile device." Ex. 1001, 24:13-20. Independent claims 10 and 19 include similar limitations. *Id.* at 25:22-28, 26:28-34.

i. Contentions

Petitioner contends that Hoffman's system 801 includes interfaces 803 "that allow 'remote devices (e.g., watch 10 of FIGS. 7A and 7B) to submit and receive information' such as content that is customized based on a user's 'athletic information.'" Pet. 26. Thus, according to Petitioner, Hoffman "contemplates that the 'watch 10' can be used as an output device on which the user accesses … the customized content" of system 801.

Id. Petitioner also contends that "customized content that can be accessed through the 'system 801' can be provided to the 'device 201' for access by the user on the 'device 201.'" *Id.* (citing Ex. 1003 ¶¶ 127-128).

Alternatively, Petitioner contends that Hoffman renders obvious the "transmitting" limitation. Pet. 26. As an initial matter, Petitioner contends that although a skilled artisan would understand Hoffman to describe "optional aspects of a single system," to the extent these optional aspects are considered distinct embodiments, it would have been obvious to combine them because: (1) this would have achieved advantages, e.g., "monitor[ing] athletic information for a user as he/she performs an activity … and customizing a user's experience to improve user engagement and increase the user's motivation to continue performing athletic activities"; (2) Hoffman teaches that different software functions can be implemented on different hardware, and the embodiments are capable of interfacing with each other; and (3) this would have been the application of a known technique to a known system to yield predictable results. *Id.* at 13-15.

With respect to the "transmitting" limitation specifically, Petitioner also contends that this limitation would have been obvious because a person of ordinary skill in the art would have understood that Hoffman's "'device 201' is capable of operating as both an input device (e.g., a device that collects 'athletic information') and as an output device (e.g., a device that provides access to customized content through the 'user activity environment')." *Id.* at 26-27 (citing Ex. 1003 ¶¶ 129-131). In support, Petitioner relies upon Hoffman's teachings that "wearable monitoring devices or sensors may integrate one or more features or services provided by system 801," and "a partner or third party entity

may produce sensors or wearable athletic performance monitoring devices that are compatible with the services offered by system 801." *Id.* (citing Ex. 1004 ¶ 71).

In our Institution Decision, we explained that we were unpersuaded, at least preliminarily, by Petitioner's contentions. Inst. Dec. 24-29.

In its post-institution Response, Patent Owner contends that the customized content identified by Petitioner, whether media content or external content, is transmitted only through interfaces 805, 807, or 809; according to Patent Owner, none of this content is transmitted through interface 803, which is the only interface in communication with watch 10. PO Resp. 33-34. Moreover, Patent Owner acknowledges that although a user's athletic activity may be transmitted, via interface 803, to system 801, "Hoffman provides no disclosure of what specific content is transmitted *back to* the 'remote devices' at all, much less transmission of any 'selected content' as required." *Id.* at 34-35 (emphasis added). With respect to obviousness, Patent Owner argues that Petitioner fails to show that a person of ordinary skill in the art would have combined Hoffman's different embodiments, and fails to explain why the "transmitting" limitation would have been obvious. *Id.* at 37-42.

In its Reply, Petitioner argues, *inter alia*, that the Board's Institution Decision improperly focused on whether it would have been obvious to *modify* Hoffman to satisfy the "transmitting" limitation, where the Petition instead proposed that a skilled artisan would have

found it obvious to *supplement* Hoffman's teachings. Pet. Reply 23.[7] Specifically, Petitioner alleges:

> [T]he Petition's alternative obviousness contention seeks to supplement this missing teaching—i.e., Hoffman's silence "regarding what is transmitted to the remote device"—through obviousness based on the knowledge of APOSITA to understand that the "device 201" could be configured to receive the "customized content." But configuring the "device 201" in this manner does not require a modification to Hoffman's teachings since nothing in Hoffman suggests that the configuration would involve removing or changing an existing teaching. Rather, the configuration involves adding a feature—transmission of "customized content" from the "system 801" to a remote device through the "interface 803"—that Hoffman neither teaches away from nor explicitly disparages.

Id. at 23-24 (citing Ex. 1003 ¶¶ 127-128) (emphasis omitted). According to Petitioner, other portions of Hoffman not considered by the Board demonstrate that it would have been obvious to "configure the 'system 801' to transmit 'customized content' back to a 'remote device.'" *Id.* at 24 (citing Pet. 26-27). For example, Petitioner identifies Hoffman's disclosure of providing a user with "activity points" to encourage a user to perform athletic activity. *Id.* at 25 (citing Ex. 1003 ¶ 69; Ex. 1004 ¶¶ 4-10, 108). According to Petitioner, "[c]ombining these portions of Hoffman together, there

[7] Petitioner alleges that Patent Owner does not dispute the obviousness of these limitations. Pet. Reply 22. The record is to the contrary. *See* PO Resp. 39-42.

is recognition that information collected through the 'system 801' (e.g., 'activity points' corresponding to 'athletic activity') is transmitted back to the 'mobile device.'" *Id.* at 25-26 (citing Ex. 1003 ¶¶ 129-131; Ex. 1004 ¶¶ 77, 108; Pet. 26-27) (emphasis omitted).

ii. Anticipation

Considering the record anew, we are not persuaded that Hoffman discloses transmitting selected content to the mobile device. Hoffman's system 801 includes several different interfaces: interfaces 803, 805, 807, 809. Ex. 1004 ¶¶ 70-71. However, interface 803 is the only interface disclosed as permitting communication with "remote devices (e.g., watch 10 of FIGS. 7A and 7B) to submit and receive information." *Id.* ¶ 70. Thus, although Hoffman explains that information may be transmitted to a mobile device, via interface 803, Hoffman does not disclose *the type of information* that is transmitted through that interface, and certainly does not disclose transmission of the claimed "selected content." *Id.* Hoffman is silent regarding what is transmitted to the remote device. *Id.* The only detail provided by Hoffman regarding the information transmitted through interface 803 concerns information transmitted *from* the remote device, which is not relevant to the claim language ("transmitting … *to* the mobile device"). *Id.* ("detected athletic activity may then be transmitted to system 801 for analysis and storage").

Additionally, even if we accept Petitioner's contention that Hoffman discloses that content may be customized for a user—e.g., articles, advertisements, or customized products, services, or events (Pet. 22-24)—Hoffman does not disclose that any of this content is transmitted to the remote device. Rather, Hoffman explains that articles may be posted to other sites

through interface 805 (Ex. 1004 ¶ 70), products and services may be offered through interface 807 (*id.*), and additional interoperable products and services may be offered through interface 809 (*id.* ¶ 71). Likewise, although Hoffman's marketing engine 810 may display advertisement information to a user (*id.* ¶ 72), Hoffman does not disclose *how* this information is displayed, i.e., Hoffman does not disclose that this content is transmitted to a remote device. Unlike interface 803, Hoffman does not disclose that any of interfaces 805, 806, 809, or engine 810, communicate with remote devices. Dr. Anthony's testimony does not persuade us otherwise. *See* Ex. 1003 ¶¶ 127-128 (similar contentions).

For the foregoing reasons, we are not persuaded by Petitioner's contention that Hoffman discloses the "transmitting" limitation of independent claim 1, or the similar limitations of claims 10 and 19.

iii. Obviousness

In the Petition and in its Reply, Petitioner argues that Hoffman discloses optional aspects of a single system. Pet. 13-15; Pet. Reply 15-19. For sake of argument, we accept Petitioner's contention. However, *even if* Hoffman discloses optional aspects of a single system, Petitioner still has not shown that Hoffman renders obvious the "transmitting" limitation.

In the Petition, Petitioner alleged that it would have been obvious to transmit "selected content" to Hoffman's remote device because "'device 201' is capable of" receiving such information. Pet. 26. This contention, however, fails to explain *why* a person of ordinary skill in the art would have been motivated to supplement Hoffman's teachings such that "selected con-

tent" is transmitted to device 201.[8] Surely, device 201 is capable of other uses—including receiving other types of non-selected transmitted content—yet every such use is not rendered obvious merely because the device is so capable. In its Reply, Petitioner contends that "the [proposed] configuration involves adding a feature—transmission of 'customized content' from the 'system 801' to a remote device through the 'interface 803'—that Hoffman neither teaches away from nor explicitly disparages." Pet. Reply 24 (emphasis omitted). Again, this is not affirmative reasoning to explain *why* a person of ordinary skill would have implemented the proposed configuration.

"[T]he PTAB must make a finding of a motivation to combine when it is disputed. Although identifying a motivation to combine 'need not become [a] rigid and mandatory formula[ ],' the PTAB must articulate a *reason why* a [person of ordinary skill in the art] would combine the prior art references." *In re Nuvasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016) (internal citations omitted); *see also id.* at 1383 ("'[C]onclusory statements' alone are insufficient and, instead, the finding must be supported by a 'reasoned explanation.'" (citing *In re Lee*, 277 F.3d 1338, 1343-45 (Fed. Cir. 2002)); *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016). Petitioner offers no such "reason why." Petitioner's contentions that (1) Hoffman is capable of receiving selected content,

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[8] We are unpersuaded by Petitioner's attempt to distinguish an alleged "modification" to a reference from a "supplementation" of a reference. Pet. Reply 23. A "supplementation" is a "modification." Regardless, it was incumbent upon Petitioner to explain *why* a skilled artisan would have found it obvious to expand upon what is disclosed in Hoffman.

and (2) does not disparage receiving selected content, are not *reasons why* an ordinarily skilled artisan would have been motivated to transmit selected content to Hoffman's remote device. Pet. 26; Pet. Reply 24. Rather, these arguments suggest only that an ordinarily skilled artisan *could have* configured such a system. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (obviousness concerns whether a skilled artisan not only could have made, but would have been motivated to make, the combination or modification to arrive at the claimed invention); *In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014) ("[T]he mere *capability* of pulling the handles is not the inquiry that the Board should have made; it should have determined whether it would have been obvious to modify the prior art apparatus to arrive at the claimed rowing machine.").

The Petition's citations to other portions of Hoffman's disclosure are unpersuasive as well. Although Hoffman discloses that "wearable monitoring devices or sensors may integrate one or more features or services provided by system 801" (Pet. 27 (quoting Ex. 1004 ¶ 71)), neither Hoffman nor Petitioner explains why a person of ordinary skill in the art would have found it obvious to integrate *this particular* feature or service, i.e., transmission of "selected content," as Petitioner proposes. Likewise, Hoffman's disclosure that partners may produce compatible devices fails to provide a rationale for the particular configuration proposed by Petitioner. *See* Pet. 27 (quoting Ex. 1004 ¶

71). Dr. Anthony's testimony is unpersuasive for the same reasons. *See* Ex. 1003 ¶¶ 129-130.[9]

Moreover, Hoffman's disclosure of "activity points," discussed in the Reply, is insufficient to demonstrate obviousness. Pet. Reply 24-26. Petitioner contends that "there is recognition that information collected through the 'system 801' (e.g., 'activity points' corresponding to 'athletic activity') is transmitted back to the 'mobile device.'" *Id.* at 25. This contention is unpersuasive for two reasons. First, the Petition did not present this reasoning. *See* Pet. 25-27. This argument is made only in the Reply and is therefore untimely. *See* 37 C.F.R. § 42.23(b). Second, this contention is not supported by any evidence of record. Although the Reply cites Dr. Anthony's declaration, *see* Pet. Reply 25-26 (citing Ex. 1003 ¶¶ 69, 129-131), the cited portions do not contend that an ordinarily skilled artisan would have recognized that activity points would have been transmitted to Hoffman's remote device. Likewise, the cited portions of Hoffman do not discuss transmission of activity points to a user. Ex. 1004 ¶¶ 4-10, 77, 108.

Finally, as noted above, we accept Petitioner's contention that Hoffman discloses optional aspects of a single system. As such, the portion of the Petition contending that an ordinarily skilled artisan would have been motivated to combine Hoffman's different embodiments (Pet. 13-15) is not applicable to the proposed configuration directed to the "transmitting" limitation

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[9] Moreover, even if this configuration was "well-known," this is not a *reason* to supplement Hoffman's system as proposed. Ex. 1003 ¶ 131.

(*id.* at 25-27). Nonetheless, that reasoning is unpersuasive.[10]

For the foregoing reasons, we are not persuaded by Petitioner's contention that Hoffman renders obvious the "transmitting" limitation of independent claim 1, or the similar limitations of claims 10 and 19.

3. Independent Claim 26

Claim 26 recites "means for selecting content" and "means for transmitting the selected content." Ex. 1001, 27:19-25. Even temporarily ignoring that these limitations presumptively invoke 35 U.S.C. § 112 ¶ 6, *see supra* II.A.3, Petitioner's contentions regarding claim 26 fail for the same reasons discussed above regarding claims 1, 10, and 19. *But see Medichem*, 353 F.3d at 933. Namely, Petitioner relies upon the same teachings of Hoffman, and the same reasoning discussed above, which we find insufficient to demonstrate that an ordinarily skilled artisan would have found it obvious to transmit selected content. *See* Pet. 30 ("While there are some minor differences in claim language, the limitations are substantially similar and are therefore anticipated and/or rendered obvious for the same reasons discussed above."), 31-32 (alleging Hoff-

[10] Even if Hoffman suggests that different embodiments can be implemented together and that this would be the application of a known technique to a known system to yield predictable results (Pet. 14-15), that alone is not sufficient to demonstrate obviousness because this does not demonstrate a *reason why* such a modification would have been made. Moreover, Hoffman's data display configuration device 601, utilized in Figures 2 and 5, already customizes a user's experience by configuring data. Ex. 1004 ¶¶ 51, 55, 57. Likewise, system 801, utilized in Figures 8A-C, already monitors athletic information for a user. Ex. 1004 ¶¶ 69, 70, 73 75. As such, this is not a persuasive reason to combine embodiments. Pet. 13-14.

man's "'computer 101' performs functions analogous to the 'host computer system 140' and 'computer system 800' of the '861 Patent"). For the foregoing reasons, we are not persuaded by Petitioner's contention that Hoffman discloses or renders obvious the "means for selecting content" and "means for transmitting content" of claim 26.

Moreover, as discussed in II.A.3, claim 26 presumptively invokes 35 U.S.C. § 112 ¶ 6, and the Petition does not identify specific structural algorithms corresponding to the functions of, e.g., the "means for analyzing the physiological state data" and the "means for selecting content." Because Petitioner has not identified sufficient structure corresponding to the functions recited in claim 26, we cannot ascertain the differences between the claimed invention and the asserted prior art, as required by *Graham v. John Deere*, i.e., we cannot determine whether the prior art includes the corresponding structural algorithm or equivalents. *See, e.g.*, *Fresenius*, 582 F.3d at 1299-1300; *BlackBerry Corp. v. MobileMedia Ideas, LLC*, IPR2013-00036, Paper 65, 19-20 (PTAB Mar. 7, 2014) (explaining that a functional analysis is insufficient, and "an obviousness determination based on less than all of the claimed elements is speculative as to the meaning or scope of the claims" (citing *In re Steele*, 305 F.2d 859, 862-63 (CCPA 1962))).

Petitioner disagrees, and makes two arguments, each of which is unpersuasive. First, Petitioner contends that the Board "need not resolve claim construction issues for claims 26-34 to reach the merits of the unpatentability grounds presented in the Petition." Pet. Reply 14-15.

However, our reviewing court clearly instructs the opposite. The Federal Circuit is clear that evaluation

of an obviousness ground is a two-step process. The first step "is a proper construction of the claims"; the second step "requires a comparison of the properly construed claim to the prior art." *Medichem*, 353 F.3d at 933. In the context of a means-plus-function claim, this requires a challenger to "prove that the corresponding structure—or an equivalent—was present in the prior art. … [A] functional analysis alone will not suffice." *Fresenius*, 582 F.3d at 1299-1300.

Petitioner does not persuade us that this firmly established approach differs in practice before the Board. Pet. Reply 14-15. Petitioner's only support for this argument is its citation to *Samsung Electronics Co. LTD v. Affinity Labs of Texas, LLC*, IPR2014-01181, Paper 36 at 28-29 (PTAB Jan. 28, 2016). In that case, the petitioner did not construe the "means for recharging [an] internal battery" in the petition but, in its reply, identified corresponding structure as a "battery recharger." *Id.* at 28. The panel found that this structure was incorrect, because the challenged patent disclosed recharging through "an interface that provides both recharging power and data communications," e.g., a USB port. *Id.* at 28-29. However, because the petitioner provided evidence showing that an ordinarily skilled artisan "would have sought to add both rechargeable batteries and a USB interface—which provides both recharging power and data connectivity—to [the prior art]," the panel determined that the limitation was satisfied, "under either Petitioner's proposed construction or the structure for recharging the internal battery set forth in the [challenged] patent." *Id.* at 29.

Contrary to Petitioner's argument, *Samsung* does not stand for the proposition that the Board "need not resolve claim construction issues … to reach the merits of the unpatentability grounds." Pet. Reply 14-15. To

the contrary, the *Samsung* panel resolved claim construction prior to reaching the merits of the prior art ground. *Samsung*, Paper 36 at 29. Moreover, that the prior art in *Samsung* taught corresponding structure in the form of discrete, off-the-shelf components (a rechargeable battery or a USB interface) is not persuasive in this proceeding, where we must determine whether the prior art teaches an algorithm not identified by Petitioner in its Petition (or in its Reply).

We find the decision in *Syrinix, Inc. v. Blacoh Fluid Control, Inc.*, IPR2018-00414, Paper 33 at 43 (PTAB May 22, 2019), identified by Patent Owner, to be more probative. PO Sur-reply 3-5. The petitioner in *Syrinix* also failed to identify corresponding structure in the petition, but identified corresponding structure in its reply. *Syrinix*, Paper 33 at 42-43. The panel found that the petitioner failed to comply with 37 C.F.R. § 42.104(b)(3) by failing to provide an identification in the petition, and also failed to comply with 37 C.F.R. § 42.23(b) because the reply exceeded the proper scope. *Id.* at 43. The panel declined to consider the new, reply contentions but also noted that, "[e]ven if we did consider Petitioner's new contentions, they would be insufficient. Petitioner identifies alleged corresponding structures in the '553 patent, but does not provide any contention concerning where these structures are disclosed in [the asserted prior art]." *Id.* This is consistent with the Federal Circuit's instruction that we first construe the claims and then, second, compare the construed claims—including the corresponding structure—to the prior art.

Thus, for the foregoing reasons, we do not agree with Petitioner's argument that the Board "need not resolve claim construction issues for claims 26-34 to

reach the merits of the unpatentability grounds presented in the Petition." Pet. Reply 14-15.

Second, Petitioner contends that the record has developed since the Petition was filed, and the Board is capable of applying the prior art to the algorithms identified in the Patent Owner Response, in light of additional arguments presented by Petitioner in its Reply. Pet. Reply 8-14; Tr. 14:16-18, 17:13-19. We disagree.

The Petition itself fails to demonstrate that Hoffman teaches the algorithms identified by Patent Owner. For example, Patent Owner contends that the algorithm associated with the "means for analyzing the physiological state data" is disclosed at "step 430 of Figure 4, step 535 of Figure 5, or step 640 of Figure 6 and described in the Specification at 15:13-39, 17:7-11, or 19:15-41," which "may include, for example, 'using the physiological state data to identify a likely physiological state of the user,' and may also include identifying an intensity level." PO Resp. 19. Even if we accept that this is a sufficient algorithm, Petitioner has not shown that Hoffman teaches it. Rather, in the Petition, Petitioner states only that "the functions recited by claims 26, 28, and 29 are performed by 'host computer system 140' and 'computer system 800.' Hoffman discloses these structures since a 'computer 101' performs functions analogous to the 'host computer system 140' and 'computer system 800' of the '861 Patent." Pet. 31 (internal citation omitted). This contention is purely functional; Petitioner does not demonstrate that Hoffman teaches the identified corresponding structural algorithm, including any of the content identified by Patent Owner. Petitioner's analysis of similar limitations appearing in claim 1 also fails to show that Hoffman teaches the identified corresponding structural algorithm. *Id.* at 20-21. Additionally, in its Reply, Petition-

er does not even attempt to show where such algorithmic structure is taught by Hoffman. Pet. Reply 8-9; *see also id.* at 9-13 (but contending that Hjelt teaches these algorithms).

For the foregoing reasons, we are not persuaded by Petitioner's contention that Hoffman anticipates or renders obvious the "means for analyzing the physiological state data" of claim 26.

4. Dependent Claims 3-5, 12-14, 21, 22, and 28-30

Each of dependent claims 3-5, 12-14, 21, 22, and 28-30 depends, directly or indirectly, from independent claim 1, 10, 19, or 26. The analysis of these dependent claims incorporate the deficiencies identified above. *See supra* II.D.2-3. Accordingly, for the same reasons, we are not persuaded by Petitioner's contentions that Hoffman anticipates or renders obvious these claims.

5. Summary

In view of the foregoing, we conclude that Petitioner has not established by a preponderance of the evidence that claims 1, 3-5, 10, 12-14, 19, 21, 22, 26, and 28-30 of the '861 patent are unpatentable as anticipated by or obvious over Hoffman.

E. Obviousness over Hoffman, Morris, and Lundqvist, or Hoffman and Lin

Petitioner contends that claims 6, 15, and 31 of the '861 patent are unpatentable as obvious over Hoffman, Morris, and Lundqvist, and also contends that claims 7-9, 16-18, 23-25, and 32-34 are unpatentable as obvious over Hoffman and Lin. Pet. 32-49. Patent Owner does not present arguments against these contentions separate from those made regarding the independent claims, as discussed above. PO Resp. 43.

Claims 6-9, 15-18, 23-25, and 31-34 depend directly or indirectly from independent claim 1, 10, 19, or 26. Accordingly, Petitioner's contentions with respect to these dependent claims suffer from the same infirmities discussed above regarding claims 1, 10, 19, and 26. Petitioner does not rely upon Morris, Lundqvist, or Lin in a manner that would cure these deficiencies. Pet. 32-49.

Thus, for the foregoing reasons, we conclude that Petitioner has not established by a preponderance of the evidence that claims 6-9, 15-18, 23-25, and 31-34 are unpatentable as obvious over Hoffman, Morris, and Lundqvist, or over Hoffman and Lin.

F. Anticipation by or Obviousness over Hjelt

Petitioner contends that claims 1, 3-5, 10, 12-14, 19, 21, 22, 26, and 28-30 of the '861 patent are unpatentable as anticipated by and/or obvious over Hjelt. Pet. 49-61. Patent Owner opposes. PO Resp. 43-67.

1. Overview of Hjelt (Ex. 1008)

Hjelt is a U.S. patent titled "System, Method and Computer Program Product for Managing Physiological Information Relating to a Terminal User." Ex. 1008, code (54). Hjelt's Figure 17 is reproduced below.

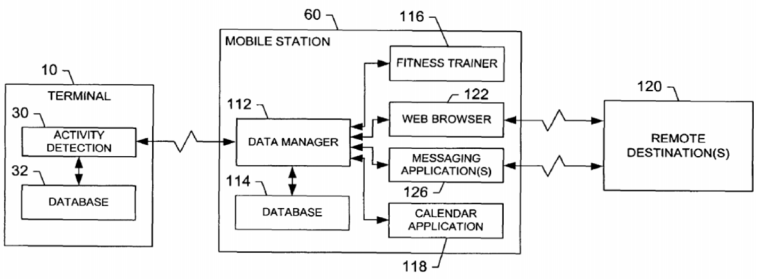

FIG. 17.

Figure 17 is a "functional block diagram of a terminal providing or otherwise transferring one or more pieces of physiological information to one or more destinations via a mobile station." *Id.* at 4:59-62.

As shown in Figure 17, Hjelt discloses terminal 10 (e.g., a mobile telephone) with activity detection application 30 for monitoring the user's fitness activities, and sensors 34 (not shown) for sensing, e.g., the ambient conditions of the terminal or user, or one or more physiological conditions of the user. *Id.* at 5:14-25, 6:9-12, 6:29-45, Figs. 1-2E (terminal 10), Fig. 3 (activity detection). Hjelt explains that activity detection application 30 communicates with mobile station 60 and/or with remote destination(s) 120, as shown in Figure 17, "to thereby permit the destination to receive physiological information from the terminal." *Id.* at 18:22-27, 22:19-25. According to Hjelt,

> The destination can thereafter manage or otherwise utilize the physiological information in any of a number of different manners. For example, the destination(s) can be capable of viewing the physiological information, as well as creating, modifying or otherwise customizing workout programs or routines, including setting reminders, alarms or the like (collectively referred to as "alerts") based upon a schedule of performing the activities of a workout program. In this regard, the destination(s) can be further capable of communicating with the terminal to transfer content to the terminal, such as the created, modified or otherwise customized workout programs or routines, and/or the alert(s).

Id. at 22:25-40; *see also id.* at 26:13-39 (similar), 26:65-27:14 (explaining that "destinations may select or otherwise determine content to return or otherwise transfer to the terminal 10," such as "a new exercise program, and/or modifications or adjustments to an existing exercise program … new or adjusted goals … other content related to an exercise program … [or] one or more alerts (e.g., reminders, alarms, etc.)"), Fig. 18 (depicting a flow chart of the transfer of content from a destination to a terminal).

2. Independent Claims 1, 10, and 19

Independent claim 1 recites "selecting, by the host computer system, content from a plurality of predefined content … at least partially based on the physiological state data collected from the user, … [but] not including the physiological state data collected from the user; and transmitting, by the host computer system, the selected content to the mobile device." Ex. 1001, 24:13-20. Independent claims 10 and 19 include similar limitations. *Id.* at 25:22-28, 26:28-34. In other words, these claims require that the content that is transmitted to the mobile device:

(1) is selected from a plurality of predefined content (i.e., from "multiple content items that exist prior to receiving the physiological state data" (*see supra* II.A.2)),

(2) is at least partially based on the user's collected physiological state data, and

(3) does not include the collected physiological state data.

See, e.g., Ex. 1001, 24:13-18; Tr. 43:22-44:2.

Petitioner contends that Hjelt discloses or renders obvious the "selecting" and "transmitting" limitations.

Pet. 53-56. According to Petitioner, Hjelt's destination 120 "can 'select or otherwise determine content to return or otherwise transfer to the terminal 10,'" including a new exercise program, "modifications or adjustments to an existing exercise program," new or adjusted goals, or "other content related to an exercise program or the user's progress." *Id.* at 53-54. Thus, Petitioner contends that the content "can be selected from '*a plurality of pre-defined content*.'" *Id.* at 54.

Alternatively, Petitioner alleges that Hjelt renders obvious the selection of predefined content, because an ordinarily skilled artisan would have understood that "'destination 120' can select content from a 'predefined' library of content," and also would have understood that destination 120 can adjust or modify existing content. *Id.* at 54 (emphasis omitted). Moreover, Petitioner contends an ordinarily skilled artisan "would have understood that Hjelt … contemplates storing a library of 'predefined' content that corresponds to, for example, an exercise program of a user, or the user's goals for the exercise program," and discloses storing physiological and content information in databases. *Id.* (citing, e.g., Ex. 1003 ¶¶ 185-187) (emphasis omitted). According to Petitioner, an ordinarily skilled artisan "would have recognized that content stored by the 'destination 120' could represent a 'pre-defined' library of content from which content is selected and transmitted to the 'terminal 10' based on received 'physiological information.'" *Id.* at 54-55.

Petitioner also contends that the content selected by destination 120, e.g., "modified or customized exercise programs, alerts … , or calendars reflecting workout schedules," includes information other than the received physiological information. *Id.* at 55 (citing,

e.g., Ex. 1003 ¶ 188) (alternatively contending this would have been obvious).

In our Institution Decision, we found these contentions to be supported sufficiently for purposes of institution. Inst. Dec. 34. We preliminarily determined that Hjelt disclosed "select[ing]" content, e.g., an exercise program or an alert, and we concluded that the content "appears to exist prior to receiving the physiological state data." *Id.* at 35 (quoting Ex. 1008, 26:65-27:14). Thus, we preliminary found that the content was "predefined." *Id.*

Patent Owner disagrees with Petitioner's contentions and our preliminary findings. PO Resp. 48-63. Patent Owner argues that even if Hjelt discloses *selecting* content, as noted in the Institution Decision, this demonstrates only that the content exists when it is selected; this does not demonstrate that the content exists *prior to* receiving the physiological state data, as required by our claim construction. *Id.* at 50-51. Thus, Patent Owner argues, "the Institution Decision's conclusion that the selection of content (an exercise program or alert) thus 'appears to fall within the scope of this limitation, because the program or alert appears to exist prior to receiving the physiological state data' conflates two separate requirements of the claims and misses the mark." *Id.* at 51; *see also* Tr. 42:11-53:5 (Patent Owner's counsel arguing that the new exercise program "exists at the time it was selected, but the assumption there that … you're selecting something that existed prior to receiving the physiological state data, that's nowhere in the record").

Patent Owner also argues that each of the content items identified by Petitioner—i.e., new or modified exercise programs, new or adjusted goals, or "other

content"—does not satisfy all three requirements of selected content, identified above, "because they fail to exist in mobile station 60 or remote destination 120 prior to receiving 'physiological state data,' are not based on 'physiological state data,' and/or include the 'physiological state data.'" PO Resp. 51.[11]

For example, Patent Owner contends that new or modified exercise programs "are based on Hjelt's 'selected activities,'" not "physiological state data," as properly construed. *Id.* at 55; *see also id.* at 46-47 (discussing Hjelt's "physiological information"), 51-54 (explaining that Hjelt's terminal monitors and identifies a user's activity, manages a user's fitness goals, and transmits this physiological information to the destination); Ex. 1008, 26:18-29.[12] Patent Owner also argues that *even if* "selected activities" are "physiological state data," the new or modified exercise programs are selected or generated *after* receiving that data and, therefore, do not exist prior to receipt of the data. *Id.* at 56.

Next, Patent Owner argues that new and adjusted fitness goals "are based on a user's goals," not "physiological state data," as properly construed. *Id.* at 57. Additionally, Patent Owner argues that *even if* a user's goals are "physiological state data," the new or adjusted goals do not exist prior to receipt of the data. *Id.* at 57-58.

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[11] We do not agree that "predefined content" must "exist in Hjelt's mobile station 60 or remote destination 120." PO Resp. 51. This is not required by the plain language of the claims, or by our construction. *See supra* II.A.3; *see also* Pet. Reply 6.

[12] Patent Owner also argues that Hjelt does not generate new or modified exercise programs "based on" heart rate data, which Patent Owner concedes may be "physiological state data," as construed. *Id.* at 47-48, 55-56; Ex. 2002, 98:6-101:3.

Finally, Patent Owner argues that Hjelt's other content, like calendars and alerts, are based on a "user's 'selected activities,'" not "physiological state data," as properly construed. *Id.* at 58-59. Additionally, Patent Owner argues that *even if* "selected activities" are "physiological state data," the calendars and alerts do not exist prior to receipt of the data. *Id.* at 59-60.

Upon review of the parties' arguments and cited evidence, we agree with Patent Owner. For sake of argument, we accept Petitioner's contention that the "physiological information" received by Hjelt's destination 120 is "physiological state data," as properly construed. Pet. 50-52; *but see* PO Resp. 47-48, 55-56, 57, 58-59 (disputing).

New Exercise Program

Hjelt discloses that a "new" exercise program may be selected or generated based on received physiological state data. Hjelt explains, for example, that "after performing one or more operations based upon the [received] piece(s) of physiological information," the destination may "select or otherwise determine content" to transmit to the terminal, such as "a new exercise program." Ex. 1008, 26:65-27:5.[13] Hjelt does not specify

[13] Similar consistent disclosures appear elsewhere in Hjelt, including in the portions cited by Petitioner. *See* Pet. 52-56; *see, e.g.*, Ex. 1008, 2:54-3:6 (destination provides content to terminal based upon physiological information, e.g., adjusted exercise program and/or alerts), 22:19-40 (destination views physiological information; creates, modifies, customizes exercise programs; sets reminders and alarms; transfers content to the terminal), 22:63-23:9 (destination can store information or operate a fitness trainer or calendar application), 23:43-49 (destination receives content from, and transfers content to, terminal, including modified exercise schedules and/or alerts), 26:13-64 (explaining that the destination is capable of, "based upon the piece(s) of physiological infor-

when this information was created, e.g., when it "exist[ed]." *See supra* II.A.3. Thus, we agree with Patent Owner that the evidence shows that Hjelt's new exercise program exists *when it is selected* for transmission to the terminal—i.e., "after performing one or more operations based upon the piece(s) of physiological information"—but says nothing about whether that new exercise program "exist[ed] prior to receiving the physiological state data," i.e., Hjelt's physiological information, as required by our construction of "a plurality of predefined content." Tr. 42:11-53:5; *see supra* II.A.3.

Petitioner does not direct us to any persuasive evidence demonstrating that Hjelt's new exercise program exists at that critical point in time, i.e., before receiving the physiological information, or that this would have been obvious. Pet. 53-56 (citing Ex. 1008, 2:54-3:6 (disclosing that the destination "can provide content to the terminal based upon the physiological information"), 22:63-23:9 (disclosing that a destination is capable of storing a database or operating an application)) (no obviousness arguments regarding new exercise programs); Pet. Reply 1-6. Likewise, the cited testimony of Dr. Anthony fails to show that any new exercise program exists *before* receipt of physiological state data. Ex. 1003 ¶¶ 184-187. Instead, we credit Dr. Villasenor's testimony that such content did not exist prior to receiving physiological information, but rather is created upon receiving such information, because this

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mation, generat[ing] an exercise program … guid[ing] the user through the exercise program, and/or modify[ing], customiz[ing] or otherwise adjust[ing] the program and/or the user's goals … based upon the user's progress"; also disclosing scheduling calendars and alerts).

testimony is consistent with Hjelt's disclosure. Ex. 2003 ¶ 131; *see generally id.* ¶¶ 120-145.

Accordingly, we determine that Hjelt's "new" exercise program does not qualify as selected content.

Modified Exercise Program

As discussed above, among other things, the selected content must have "exist[ed] prior to receiving the physiological state data" *and* must be transmitted to the terminal. Hjelt's "modified" exercise programs are not shown to be "selected content" for two reasons. First, Petitioner has not shown that a modified program "exist[ed] prior to receiving the physiological state data" and, second, Petitioner has not shown that the original, base exercise program—upon which the modifications were made—is transmitted to the terminal along with the modification.

Hjelt explains that after operations are performed on the received physiological information, the destination may select content to transmit to the terminal, such as "modifications or adjustments to an existing exercise program (including one or more activities of an existing program)." Ex. 1008, 26:65-27:7. Thus, Hjelt explains that in order to create "modifications or adjustments," an original, base exercise program already exists. *Id.* However, even if this original, base program exists prior to receipt of the physiological state data, Petitioner does not (and presumably could not) establish that the modifications or adjustments themselves, i.e., the content that is "transfer[red] to the terminal" (*id.* at 27:3-7), exists at that same point in time. Pet. 53-55 (citing Ex. 1008, 2:54-3:6, 22:63-23:9).

The cited testimony of Dr. Anthony also fails to show that any modified exercise program exists *before*

receipt of physiological state data Ex. 1003 ¶¶ 184-187. We recognize that Dr. Anthony opines that because destination 120 may transmit "modified versions of existing content," Hjelt's system "selects content from 'a plurality of pre-defined content.'" *Id.* ¶¶ 185, 186 (similar) (emphasis omitted). These opinions, however, are offered without any supporting evidence or persuasive explanation. For example, Dr. Anthony fails to articulate how an exercise program that is modified *based on received physiological information* could exist prior to receipt of that information. As such, we afford it minimal weight. Instead, we find Dr. Villasenor's testimony to be more probative because it is consistent with Hjelt's disclosure. Ex. 2003 ¶ 131; *see generally id.* ¶¶ 120-145.

Moreover, during the oral hearing, Petitioner's counsel argued that at least some portion of the original, base exercise program is transmitted to the terminal, along with the modifications. Tr. 56:4-57:14; Pet. Reply 6. We are not persuaded. Petitioner does not identify any support—whether in Hjelt or through its declarant—for this proposition. *See generally* Tr. 56:4-57:14; Pet. 55-56; Pet. Reply 6; Ex. 1003 ¶¶ 184-187; *but see* PO Sur-reply 17-18. Nor does Petitioner support its contention that a *portion* of the original, base program is transmitted with the modified program. Tr. 56:4-57:14; Pet. Reply 6 (arguing that "some aspect of the exercise programs or user goals necessarily existed when the 'physiological information' was received," but not arguing that this "aspect" is transmitted to the destination). To the contrary, we discern that if an original, base program is modified based on received physiological data, transmission of the original, base program, or a portion thereof, is likely unnecessary; it is the *modified* program or portion that needs transmission.

Nonetheless, it is Petitioner's burden to support its contentions, and Petitioner fails to identify any supporting evidence on this point.

We are also unpersuaded by Petitioner's contention that it would have been obvious to select predefined content. Pet. 54-55 (citing Ex. 1003 ¶¶ 185-187; Ex. 1008, 6:1-28, 22:41-62, 22:63-23:9). Petitioner does not identify any *reason why* an ordinarily skilled artisan would have found it obvious to select predefined content, as claimed. Instead, Petitioner merely contends that Hjelt's destination modifies content and that Hjelt "contemplates" storing libraries of content, including, e.g., exercise programs, because Hjelt discloses databases. *Id.* at 54. Even accepting this as true, this does not explain *why* an ordinarily skilled artisan would have found it obvious to select predefined content, as construed, for transmission to the terminal. *Id.* at 54-55; *see, e.g.*, *Belden*, 805 F.3d at 1073; *In re Giannelli*, 739 F.3d at 1380; PO Resp. 61-63.

The cited portions of Dr. Anthony's declaration also fail to explain why this would have been obvious. Ex. 1003 ¶¶ 185-187. Instead, Dr. Anthony opines that an ordinarily skilled artisan would have understood that Hjelt contemplates storing a library of predefined content, which, as we stated in out Institution Decision, is not relevant to the claims as construed. *Id.* 187; Inst. Dec. 35-36; *see also* Inst. Dec. 36 n.3 (inviting the parties to address whether storing a library of content is pertinent to the claim language); *see generally* Pet. Reply (failing to make such an argument); Pet. Reply 7 (arguing the claims do *not* specify where predefined content is stored); PO Resp. 60-61. Additionally, Dr. Anthony opines that, because Hjelt discloses modifying content, Hjelt would have been understood to store a library of predefined content, presumably including the

original, base content to be modified. Ex. 1003 ¶ 187. Even if this is true, Petitioner and Dr. Anthony fail, as discussed above, to demonstrate that such content exists before receiving the physiological information and/or fail to demonstrate that the original base program is transmitted to the terminal. Neither Petitioner's obviousness contentions nor Dr. Anthony's testimony resolves these deficiencies.

Accordingly, we determine that Hjelt's "modified" exercise program does not qualify as "selected content."

Other Content

Petitioner's contentions regarding Hjelt's disclosure of other content, such as new and adjusted goals, calendar reminders, and alerts fail for substantially the same reasons as discussed above regarding new and modified exercise programs.

As above, Hjelt explains that after operations are performed on the received physiological information, the destination may select content to transmit to the terminal, such as "new or adjusted goals" or "alerts." Ex. 1008, 26:65-27:14. However, Hjelt does not identify when these items came into existence and, as above, Petitioner does not direct us to any persuasive evidence demonstrating that these content items exist at the critical point in time—before receipt of physiological state data—or that this would have been obvious. Pet. 53-56 (citing Ex. 1008, 2:54-3:6, 22:63-23:9); Pet. Reply 1-6; Ex. 1003 ¶¶ 184-187; *but see* Ex. 2003 ¶¶ 135, 139; *see generally id.* ¶¶120-145.

Summary

For the foregoing reasons, Petitioner has not demonstrated by a preponderance of the evidence that

Hjelt discloses or renders obvious the "selecting" and "transmitting" limitations of independent claims 1, 10, and 19.

3. Independent Claim 26

Claim 26 recites "means for selecting content" and "means for transmitting the selected content." Ex. 1001, 27:19-25. Even temporarily ignoring that these limitations presumptively invoke 35 U.S.C. § 112 ¶ 6, Petitioner's contentions regarding claim 26 fail for the same reasons discussed above regarding claims 1, 10, and 19. *But see Medichem*, 353 F.3d at 933. Namely, Petitioner relies upon the same teachings of Hjelt, and the same reasoning discussed above, which we find insufficient to demonstrate that a skilled artisan would have found it obvious to transmit selected content, as construed. *See* Pet. 60 (arguing claim 26 is "taught and/or rendered obvious over *Hjelt* for the same reasons discussed above" and contending Hjelt's "'destination 120' performs functions analogous to the 'host computer system 140' and 'computer system 800' of the '861 Patent"). For the foregoing reasons, we are not persuaded by Petitioner's contention that Hjelt anticipates or renders obvious the "means for selecting content" and "means for transmitting the selected content" of claim 26.

Moreover, as discussed in II.A.3, claim 26 presumptively invokes 35 U.S.C. § 112 ¶ 6, and the Petition does not identify structural algorithms corresponding to the functions of, e.g., the "means for analyzing the physiological state data" and the "means for selecting content," which precludes our comparison of the claims against the prior art. *See supra* II.D.3. As noted above, the Petition is deficient for failing to identify

corresponding algorithms and, instead, making only functional comparisons to Hjelt. *Id.*; Pet. 60.

As discussed above, *see supra* II.A.3 and II.D.3, Petitioner was obliged to identify corresponding algorithms in its Petition, and failed to do so. Like the panel in *Syrinix*, we determine that Petitioner's failure violates 37 C.F.R. § 42.104(b)(3). *Syrinix*, Paper 33 at 43. Moreover, *even if* we consider the arguments made in Petitioner's Reply, whereby Petitioner attempts to show that the "specialized algorithms" identified in the Patent Owner Response "are also disclosed by the prior art cited in the Petition," (Pet. Reply 8-9), we are unpersuaded by those contentions. For example, Petitioner does not demonstrate that Hjelt teaches the algorithm identified by Patent Owner for the "means for analyzing the physiological state data."

Specifically, Patent Owner contends that the algorithm associated with the "means for analyzing the physiological state data" is disclosed at "step 430 of Figure 4, step 535 of Figure 5, or step 640 of Figure 6 and described in the Specification at 15:13-39, 17:7-11, or 19:15-41," which "may include, for example, 'using the physiological state data to identify a likely physiological state of the user,' and may also include identifying an intensity level." PO Resp. 19. Upon review of the'861 patent, we discern that the cited figures provide only functional, not algorithmic, detail. *See, e.g.*, Ex. 1001, Fig. 4, 430 ("Analyze physiological state data"). However, the cited portions of the Specification arguably provide three examples of algorithmic detail:

> (1) "using the physiological state data to identify a likely physiological state … [and] associat[ing that state] with an intensity level" (*id.* at 15:13-24

(nervous, low/medium/high intensity), 19:15-25 (same));

(2) "determining a physiological state of the user" (*id.* at 17:7-11 (e.g., tired, happy, thirsty, or cold)); or

(3) analyzing an image for characteristics like objects or location (*id.* at 15:25-39, 19:26-41).

If we accept Patent Owner's contention that these disclosures provide sufficient algorithmic structure, we discern that Petitioner has not shown that Hjelt teaches a corresponding algorithm. In its Reply, Petitioner contends "Hjelt teaches the specialized algorithm where 'physiological information' collected by the 'terminal 10' is computed by the 'activity detection application 30' and can represent different types of information based on a type of activity performed by the user, e.g., 'intensity activity, duration activity or step activity,' among others." Pet. Reply 9-10. Petitioner however, fails to explain how collecting information and computing it to represent different types of activity information relates to the purported algorithmic examples identified by Patent Owner. For example, Petitioner does not show that Hjelt's system identifies a likely physiological state, as required by the first and second examples in the '861 Specification. Nor does Petitioner show that Hjelt's system analyzes an image, as required by the third example. At best, Petitioner contends that Hjelt's system computes and represents "intensity activity," but this is not described by the '861 patent as the complete corresponding algorithmic structure for the "means for analyzing." *See* Ex. 1001, 15:13-24, 19:15-25 (identifying a likely physiological state and *associating that state* with an intensity level).

Thus, for the foregoing reasons, we also are not persuaded by Petitioner's contention that Hjelt anticipates or renders obvious the "means for analyzing the physiological state data" of claim 26.

4. Dependent Claims 3-5, 12-14, 21, 22, and 28-30

Each of dependent claims 3-5, 12-14, 21, 22, and 28-30 depends, directly or indirectly, from independent claim 1, 10, 19, or 26. The analysis of these dependent claims incorporate the deficiencies identified above. *See supra* II.F.2-3. Accordingly, for the same reasons, we are not persuaded by Petitioner's contentions that Hjelt anticipates or renders obvious these claims.

5. Summary

In view of the foregoing, we conclude that Petitioner has not established by a preponderance of the evidence that claims 1, 3-5, 10, 12-14, 19, 21, 22, 26, and 28-30 of the '861 patent are unpatentable as anticipated by or obvious over Hjelt.

G. Obviousness over Hjelt and Kurtz

Petitioner contends that claims 2, 11, 20, and 27 are unpatentable as obvious over Hjelt and Kurtz. Pet. 61-65. Patent Owner does not present arguments against these contentions separate from those made regarding the independent claims, as discussed above. PO Resp. 44, 67.

Claims 2, 11, 20, and 27 depend directly from independent claim 1, 10, 19, or 26. Accordingly, Petitioner's contentions with respect to these dependent claims suffer from the same infirmities discussed above regarding claims 1, 10, 19, and 26. Petitioner does not rely upon Kurtz in a manner that would cure these deficiencies. Pet. 61-65.

Thus, for the foregoing reasons, we conclude that Petitioner has not established by a preponderance of the evidence that claims 2, 11, 20, and 27 are unpatentable as obvious over Hjelt and Kurtz.

III. CONCLUSION

In summary:[14]

Claims	35 U.S.C. §	Reference(s)	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30	102/103	Hoffman		1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30
6, 15, 31	103	Hoffman, Morris, Lundqvist		6, 15, 31
7-9, 16-18, 23-25, 32-34	103	Hoffman, Lin		7-9, 16-18, 23-25, 32-34

[14] 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*, 84 Fed. Reg. 16654 (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) (2019).

1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30	102/103	Hjelt		1, 3-5, 10, 12-14, 19, 21, 22, 26, 28-30
2, 11, 20, 27	103	Hjelt, Kurtz		2, 11, 20, 27
Overall Out-come				1-34

IV. ORDER

Upon consideration of the record before us, it is:

ORDERED that Petitioner has not shown by a preponderance of the evidence that claims 1-34 of the '861 patent are unpatentable; 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.

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APPENDIX C

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

IPR2018-01281
Patent 8,768,865 B2

APPLE INC.,
Petitioner,
v.
QUALCOMM INCORPORATED,
Patent Owner.

Paper 34
Date: February 24, 2020

Before
DANIEL N. FISHMAN, MICHELLE N. WORMMEESTER, and AMANDA F. WIEKER,
Administrative Patent Judges.
FISHMAN, *Administrative Patent Judge*

JUDGMENT
FINAL WRITTEN DECISION
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

Apple Inc. ("Petitioner") requests *inter partes* review of claims 1-6, 8-25, 27-30, 46-49, and 51-53 (the "challenged claims") of U.S. Patent No. 8,768,865 B2 ("the '865 patent," Ex. 1001) pursuant to 35 U.S.C. §§ 311 *et seq*. Paper 2 ("Petition" or "Pet."). Qualcomm Incorporated ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). Based on the record before us at that time, we instituted an *inter partes* review of all challenged claims and all grounds. Paper 7 ("Decision on Institution" or "Dec. on Inst.").

Patent Owner filed a Patent Owner's Response (Paper 18 "PO Resp."), Petitioner filed a Reply (Paper 22 "Reply"), and Patent Owner filed a Sur-reply (Paper 25 "Sur-reply").

We heard oral argument on October 30, 2019 and a transcript of that hearing is in the record. Paper 33.

Upon consideration of the complete record, we determine that Petitioner has proven, by a preponderance of the evidence, that claims 1-3, 5, 6, 8-22, 24, 25, 27-30, 46-49, and 51-53 are unpatentable. However, Petitioner has failed to show, by a preponderance of the evidence, that claims 4 and 23 are unpatentable.

B. Real Parties-In-Interest and Related Matters

Apple Inc. is identified as the sole real party-in-interest. Pet. 77. The parties inform us that the '865 patent was asserted against Petitioner in the litigation *Qualcomm Inc. v. Apple Inc.*, No. 3:17-cv-02402 (S.D. Cal.). Pet. 77; Paper 4, 1. Petitioner further informs us that the above-identified litigation has been dismissed. Paper 17. The parties further inform us that the '865

patent is at issue in *inter partes* review Case IPR2018-01282. Pet. 77; Paper 4, 1.

C. The '865 Patent

The '865 patent is generally directed to "machine learning of situations via pattern matching or recognition for use in or with mobile communication devices." Ex. 1001, 1:21-23. According to the '865 patent, mobile communication devices (e.g., cellular and smart phones) may feature a number of sensors (built-in or otherwise supported) such as "accelerometers, gyroscopes, magnetometers, gravitometers, ambient light detectors, proximity sensors, thermometers, location sensors, microphones, cameras, etc." *Id.* at 1:34-37. The '865 patent states that a popular feature of such mobile devices is using such sensors to better understand what a user is presently doing so as to better assist the user in his/her present activity. *Id.* at 1:42-47. However, according to the '865 patent, the growing number of sensors generates a high volume of data to be captured and analyzed and, thus, creates challenges to efficiently and effectively capture and process such voluminous data. *Id.* at 1:47-60.

Specifically, the '865 patent identifies challenges for such mobile devices as follows:

> These challenges may include, for example, detecting or "picking up" patterns from a large number of information sources with an unknown or different subset of sources being relevant to different situations or contexts. In other words, in some instances, it may be somewhat difficult to detect or recognize an existing pattern if such a pattern is not predefined or pre-specified in some manner for a certain information source. Another challenge

> with typical approaches may be, for example, identifying one or more relevant situations and learning patterns that are correlated with or correspond to these relevant situations. Consider, for example, a multi-dimensional information stream captured or obtained via a variety of sensors with respect to a typical "return-home-after-work" experience of a user.

Id. at 7:8-21. The '865 patent further identifies challenges of the prior art as follows:

> As seen, because of an increased dimensionality of an information stream due, at least in part, to a large variation of sensor-tracked parameters indicative of user-related events or conditions (e.g., walking, driving, fidgeting, etc.), finding exact or approximate matches to a template, pre-defined or otherwise, may be rather difficult. In other words, at times, a relatively large number of varying parameters or variables associated with a multi-dimensional sensor information stream may be difficult to track, correlate, process, associate, etc., which in turn may limit the ability of a mobile device to react to different situations, make relevant inferences, or otherwise be aware of its context with sufficient accuracy. In addition, certain varying parameters or variables may be irrelevant to a particular user situation or context, in which case it may be important or otherwise useful to identify irrelevant or incidental variables so as to ignore or omit one or more corresponding irrelevant patterns from consideration, as described below.

Id. at 7:40-57.

The '865 patent purports to address these challenges by monitoring "one or more conditions or events of interest," rather than continuously monitoring all or most of the available sensor information. *Id.* at 7:64-8:1. In particular, according to the '865 patent, a subset of parameters associated with a condition or event of interest may be "fixed in some manner and stored in a suitable database." *Id.* at 8:12-15. The parameter values associated with the condition or event may be fixed, for example, "by associating corresponding parameters or variables having a particular, distinct, or otherwise suitable pattern to represent the condition or event." *Id.* at 8:19-21. "A suitable processor may then look or search for a pattern match, exact or approximate, in one or more other signal-related patterns every time a condition or event-related pattern occurs, for example, by utilizing a 'snapshot,' in whole or in part, using any suitable pattern matching processes or algorithms." *Id.* at 8:25-31.

Figure 4 of the '865 patent is reproduced below.

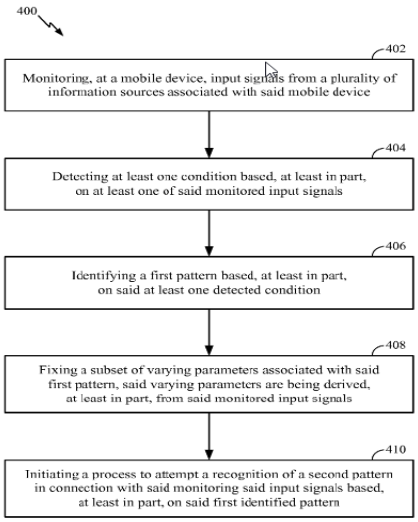

FIG. 4

Figure 4 is a flowchart of exemplary process 400 for machine learning of situations in a mobile device using pattern matching or recognition. *Id.* at 2:8-11. Step 402 monitors input signals from a plurality of sources (sensors) associated with the mobile device. *Id.* at 14:43-46. Step 404 detects at least one condition or event of interest based on at least one of the monitored input sources. *Id.* at 14:54-57. At step 406, a "first pattern may be identified based, at least in part, on at least one detected condition or event," e.g., "a distinct signal-related pattern having one or more varying parameters or variables of interest that may be representative of or otherwise correspond to such a condition or event." *Id.* at 14:67-15:5. Step 408 then fixes one or more parameters by storing them in a database or by associating the parameters with a pattern to represent a condition or event. *Id.* at 15:5-17. Step 410 then attempts to recognize a second pattern based on the first pattern. *Id.* at 15:18-21.

D. Illustrative Claim

Independent method claim 1, reproduced below, is illustrative of the challenged claims:

> 1. A method comprising:
>
> monitoring, at a mobile device, input signals from a plurality of information sources associated with said mobile device;
>
> detecting at least one condition based, at least in part, on at least one of said monitored input signals;
>
> identifying a first pattern based, at least in part, on said at least one detected condition; and

> fixing a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition, said varying parameters derived, at least in part, from said monitored input signals.

Id. at 20:62-21:8. Challenged independent claim 21 recites similar limitations in the style of an apparatus claim (*id.* at 22:24-39), and challenged independent claim 46 recites similar limitations in the style of an article of manufacture claim (a non-transitory storage medium storing programmed instructions) (*id.* at 24:20-35).

E. Prior Art and Asserted Grounds

Petitioner asserts the challenged claims are unpatentable based on the following grounds (Pet. 4-5):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1-4, 15-17, 21-23, 28, 29, 46, 47	102(b)[1]	Wang[2]

[1] The Leahy-Smith America Invents Act ("AIA") amended 35 U.S.C. §§ 102 and 103. *See* Pub. L. No. 112-29, 125 Stat. 284, 285-88 (2011). Because the application that resulted in the '865 patent was filed before the effective date of the post-AIA amendment (March 16, 2013), the pre-AIA versions of §§ 102 and 103 apply.

[2] Yi Wang et al., *A Framework of Energy Efficient Mobile Sensing for Automatic User State Recognition*, Proceedings of the 7th International Conference on Mobile Systems, Applications and Services, pp. 179-92, Krakow, Poland, June 22-25, 2009 ("Wang," Ex. 1005).

5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, 51-53	103(a)	Wang, Nadkarni[3]
12-14	103(a)	Wang, Nadkarni, Greenhill[4]

Petitioner also relies on the declaration of James F. Allen, Ph.D. (Ex. 1003) in support of its assertions. Patent Owner relies on the declaration of John Villasenor, Ph.D. (Ex. 2004) in support of its assertions.

II. ANALYSIS

A. Legal Standards

1. Anticipation

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Each element of the challenged claim must be found, either expressly or inherently, in the single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Although the elements must be arranged or combined in the same way as in the claim, "the reference need not satisfy an *ipsissimis verbis* test," i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Thus, the dispositive question is whether one ordinarily skilled in

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[3] US 2010/0217533 A1, issued Aug. 26, 2010 ("Nadkarni," Ex. 1008).

[4] US 2008/0297513 A1, issued Dec. 4, 2008 ("Greenhill," Ex. 1009).

the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074-75 (Fed. Cir. 2017). Still further, "it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom." *In re Preda*, 401 F.2d 825, 826 (CCPA 1968).

2. Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are "such that the subject matter[,] as a whole[,] would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved based on 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 skill in the art; and (4) objective evidence of non-obviousness, i.e., secondary considerations.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

B. Level of Ordinary Skill in the Art

The Petition does not specifically define the level of skill for a person of ordinary skill in the art. Dr. Allen's expert declaration in support of the Petition argues a

[5] Patent Owner does not present arguments or evidence of such secondary considerations in its briefs. Therefore, secondary considerations do not enter into our analysis.

person of ordinary skill in the art at the time of the '865 patent "would have had a Bachelor of Science degree in either computer science or electrical engineering, together with at least two years of study in an advanced degree program in artificial intelligence, machine learning, or pattern recognition, or comparable work experience." Ex. 1003 ¶ 10.

Patent Owner argues a person of ordinary skill in the art at the time of the '865 patent "would have had a Bachelor's of science degree in electrical engineering, computer science, computer engineering, or a closely-related field, and at least 2 years of work or research experience in the field of machine learning or a closely related field." PO Resp. 24 (citing Ex. 2004 ¶ 45). Patent Owner contends any differences between its definition of the level of ordinary skill and that of Dr. Allen "are not material to the issues to be decided." *Id.* (citing Ex. 2004 ¶ 47).

We discern no significant distinction between Dr. Allen's definition of the level of ordinary skill and that of Patent Owner. In view of Patent Owner's admission that any differences are not material to the issues we decide here, we discern no reason to depart from our definition of the level of ordinary skill as determined in our Decision on Institution. Dec. on Inst. 10.

Accordingly, we adopt Dr. Allen's definition of the level of ordinary skill in the art and determine that a person of ordinary skill in the art at the time of the invention of the '865 patent would have had a Bachelor of Science degree in either computer science or electrical engineering, together with at least two years of study in an advanced degree program in artificial intelligence,

machine learning, or pattern recognition, or comparable work experience.

C. Claim Construction

This proceeding was filed on June 29, 2018. In an *inter partes* review for a petition filed before November 13, 2018,[6] a claim in an unexpired patent that will not expire before the issuance of a final written decision shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b) (2017); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142-46 (2016) (upholding the use of the broadest reasonable interpretation standard ("BRI standard")); *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769 (Fed. Cir. 2018) ("In IPR, the Board gives claims their broadest reasonable interpretation consistent with the specification."). Under the broadest reasonable interpretation standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). "[A] claim construction analysis must begin and remain centered on the claim language itself …." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). "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. Med-*

[6] *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340, 51,340 (Oct, 11, 2018) (to be codified at 37 C.F.R. § 42)

tronic Sofamor Danek, Inc., 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-17 (Fed. Cir. 2005) (en banc)). "Though understanding the claim language may be aided by the explanations contained in the written description, it is important not to import into a claim limitations that are not a part of the claim." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

By contrast, for a patent that has expired or will likely expire before this Final Written Decision is entered, or for an unexpired patent challenged in a petition filed on or after November 13, 2018, we apply the principles set forth in *Phillips*, 415 F.3d at 1312-17 (the "*Phillips* standard"). *See Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1279 (Fed. Cir. 2017); *see also* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340 (Oct. 11, 2018) (codified at 37 C.F.R. § 42.100(b) (2019)).

Petitioner does not indicate whether it is applying the BRI standard or the *Phillips* standard but, instead, asserts "Petitioner gives all terms their plain meaning." Pet. 11. Patent Owner describes the BRI standard but does not clearly state that it is applying that standard for any proffered claim constructions. PO Resp. 16.

On the record before us, we discern that the '865 patent is not expired, the patent will not likely expire prior to entry of this Final Written Decision, neither party has made a request in compliance with our rules that the *Phillips* standard be applied,[7] and the Petition

[7] The applicable version of 37 C.F.R. § 42.100(b) requires that a request to apply the *Phillips* standard "must be made in the form of a motion under § 42.20, within 30 days from the filing of the petition."

was filed prior to the change of our rules regarding claim construction effective for petitions filed on or after November 13, 2018. Therefore, we apply the broadest reasonable interpretation (BRI standard) for any needed claim construction.

Petitioner proffers a construction of numerous claim terms including the terms *pattern* and *fixing* as recited in the claims. Pet. 11-14. Patent Owner disputes Petitioner's construction of these two terms. PO Resp. 1624. Patent Owner also provides a section of its Response entitled "Terminology" in which Patent Owner discusses three terms ("variables," "patterns," and "conditions") but, apparently, does not proffer these discussions as express claim constructions of those terms. *Id.* at 5-7.

Other than the terms discussed below, we discern no reason to expressly construe any other claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. "Condition"

Claim 1 recites "identifying a first pattern based, at least in part, on said at least one detected condition." Petitioner relies on disclosures of the '865 patent to interpret the term "condition," and argues,

> The '865 Patent expressly discloses that "a **condition** or event of interest may include, for example, a time of day, day of week, state or action of a host application, action of a user operating a mobile device (e.g., silencing a ringer,

> muting a call, sending a text message, etc.) or the like," and further discloses that "**user-related events or conditions" may include "walking**, driving, fidgeting, etc." [Ex. 1001, 7:40-45, 14:6064]. Accordingly, the term "condition" is broad enough to encompass at least the above-listed items.

Pet. 11 (citing Ex. 1003 ¶¶ 50-51). Thus, Petitioner does not proffer an express construction of "condition" but, instead, contends "condition" is at least broad enough to encompass the above-identified examples (i.e., including, for example, walking and driving).

Patent Owner identifies examples of conditions as including "a time of day," "action of a user operating a mobile device," "walking," and "driving." PO Resp. 7 (citing Ex. 1001, 7:42-43, 8:1-6, 8:54-60). We note that Patent Owner discusses these exemplary "conditions" in a section of the Response entitled "Terminology," a section separate from a section entitled "Claim Construction." *See* PO Resp. 5, 16. Thus, like Petitioner, Patent Owner does not proffer an express construction of "condition" but, instead provides examples of disclosed "condition[s]."

Both parties identify portions of the '865 patent Specification that disclose exemplary conditions: "sensor-tracked parameters indicative of user-related events or conditions (e.g., walking, driving, fidgeting, etc.)." Ex. 1001, 7:42-43. "By way of example but not limitation, a condition or event may include, for example, a time of day, day of week, state or action of a host application, action of a user operating a mobile device (e.g., silencing a ringer, muting a call, sending a text message, etc.) or the like, just to name a few examples." *Id.* at 8:1-6.

These exemplary conditions, though not defining or limiting the full scope of the term "condition," at least define some examples that are encompassed by the term. Although we discern no need for an express construction of the full scope of the term "condition" as used in the claims, we determine that "condition" is at least broad enough to encompass each of the exemplary above-identified examples disclosed in the '865 patent—including, for example, "walking" and "driving."

2. "Pattern"

Claim 1 includes the recitation "identifying a first pattern based, at least in part, on said at least one detected condition." Claims 21 and 46 and their respective dependent claims include similar limitations referring to a "second pattern."

Petitioner argues "[t]he term 'pattern' is broad enough to encompass a 'collection of one or more parameter values.'" Pet. 11-13 (citing Ex. 1001, 6:49-55, 9:63-67, 10:34-44, Fig. 3; Ex. 1003 ¶¶ 52-58).

Patent Owner argues the "***complete*** BRI of 'pattern' [is] 'a collection of one or more pairs of varying parameters and corresponding parameter values, as well as the relationship between each pair (where the relationship may be implicit).'" PO Resp. 16-18 (citing Ex. 2003, 28:9-15, 31:14-32:17, 56:20-23, 58:9-15; Ex. 2004 ¶¶ 37-40; Ex. 1001, Fig. 3 (as annotated by Petitioner at Pet. 12)). In Patent Owner's Sur-reply, Patent Owner contends, "[w]hile Qualcomm believes it is also accurate that a pattern includes the logical relationship between each pair (such as AND), the Board need not reach this dispute as it is not relevant to any issue to be decided." Sur-reply 3-4.

Petitioner argues Patent Owner's interpretation is incorrect because requiring a "pattern" to include relationships between two or more parameters excludes embodiments detecting patterns that rely on the value of only a single parameter. Reply 4-5 (citing Ex. 1026, 14:10-15:5, 25:20-26:5, 49:10-15; Ex. 1023 ¶ 114).

Patent Owner responds,

> This issue here is that Petitioner's proposed construction of "fixing …" is so broad that it is indistinguishable from the separately-recited "identifying a pattern." For example, the Institution Decision notes that Petitioner pointed to learning patterns in a training phase as "identifying." Decision at 21. Such learning of patterns, which includes linking of a varying parameter to a parameter value, would also be "associating" under Petitioner's construction of "fixing … by associating …."

Sur-reply 5. However, Patent Owner contends that, although it stands by its proffered interpretation, "the Board need not reach this dispute as it is not relevant to any issue to be decided." *Id.* at 4

First, we determine that the portion of Patent Owner's proffered interpretation that speaks to a parameter and its corresponding value as a "pair" is not inconsistent with Petitioner's reference to a "parameter value." In other words, we discern no meaningful difference between a "pair" that consists of a parameter and its corresponding value, as used in Patent Owner's proffered interpretation, and a "parameter value," as used in Petitioner's proffered interpretation.

Second, we agree with Petitioner that Patent Owner's proffered interpretation, requiring a "pattern" to

include relationships *between two or more such pairs*, incorrectly excludes embodiments where a "pattern" may be identified by the value of only a single parameter. We find nothing in the intrinsic evidence that supports Patent Owner's narrow interpretation. By contrast, Petitioner identifies support in the '865 patent Specification referring to a "pattern" being represented by "*one or more*" values of parameters in support of its interpretation that encompasses a single parameter value representing a "pattern." *See* Pet. 11-12 (citing Ex. 1001, 6:49-55, 9:63-67). Furthermore, Petitioner points to deposition testimony of Patent Owner's expert (Dr. Villasenor) as extrinsic evidence to support the contention that a "pattern" encompasses the value of even a single parameter.

> [Q.] … So in your opinion, a pattern could include only a single pair of parameter and its corresponding parameter value; is that correct?
>
> A. Correct.
>
> Q. So, for example, using the example in paragraph 38 of your declaration, a pattern could be location X?
>
> A. Correct.
>
> Q. And if that's the pattern, is there a relationship present?
>
> A. Well, the relationship that the X is the value corresponding to the parameter or the variable location.
>
> Q. Okay. But it doesn't include a relationship between another pair of parameter and parameter values because there isn't another pair?

> A. Well, yeah, if there's only one pair, then there can't be a relationship with another pair within that pattern.

Ex. 1026, 14:10-15:5 (cited at Reply 5). Petitioner points to additional testimony from Dr. Villasenor.

> Q. Sure. And in this example, the second pattern is "Motion State" equals "Driving" and WiFi SSID changing from SSID_3 to SSID_1?
>
> A. Well, I would -- I would say that the first pattern is "Motion State" is equal to "Driving."

Id. at 49:10-15 (cited at Reply 5).

Based on the complete record developed through trial, we determine that the broadest reasonable interpretation of "pattern" encompasses, at least, Petitioner's proffered interpretation that a "pattern" is "*a collection of one or more parameters values*."

3. "Fixing … by Associating"

Challenged independent method claim 1 recites a step of "fixing a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Similarly, challenged independent apparatus claim 21 recites a mobile device with a processor configured to "fix a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Like claim 21, challenged independent claim 46 recites an article (a non-transitory storage medium) storing instructions causing a processor of a mobile device to "fix a subset of varying parameters associated with said first pattern by associating at least one pa-

rameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." We refer to these limitations collectively as the "fixing limitations."

Petitioner argues the fixing limitations encompass "associating at least one parameter of a subset of varying parameters with the first pattern to represent at least one detected condition" and contends that claim 1 of the '865 patent, the Specification of the '865 patent, and Dr. Allen's Declaration all support this interpretation. Pet. 13-14 (citing Ex. 1001, 15:9-12, 21:3-6 (claim 1); Ex. 1003 ¶¶ 59-63). Furthermore, in support of its interpretation of "fixing," Petitioner quotes a portion of the prosecution history of the '865 patent wherein Patent Owner remarked, in response to an Examiner rejection,

> Claims 1, 22, 32, and 48 have been amended to incorporate aspects of former claims 2 and 33, to clarify that "fixing a subset of carrying parameters" is done "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition."

Pet. 13 (quoting Ex. 1002, 40).

In Patent Owner's Preliminary Response, Patent Owner argued Petitioner's proffered interpretation is unreasonable in that it eliminates the recitation of "fixing" and reduces the element to the action of "associating" regardless of whether the associating results in fixing. Prelim. Resp. 14-20. Specifically, Patent Owner argued in its Preliminary Response that the fixing element "is not met if 'associating' is performed in a context that does not result in 'fixing.'" *Id.* at 15. Patent Owner contended in the Preliminary Response that,

under the proper interpretation of the fixing limitations, "'by' introduces a necessary sub-step that must be performed when 'fixing.'" *Id.* at 16. Still further, Patent Owner argued the cited portion of the prosecution history (Exhibit 1002, 40) does not support Petitioner's interpretation but, instead, asserts, "[n]othing in that passage suggests that 'associating …' performed in a context that does not accomplish 'fixing …' would be sufficient to meet the claims." *Id.* at 19.

Our Decision on Institution determined:

> On the record before us for purposes of this preliminary decision, we are persuaded by Petitioner's proffered construction of the *fixing* limitations. Specifically, the plain language of challenged independent claims 1, 21, and 46 sufficiently defines the scope of *fixing* as limited to *fixing* ***by*** the action of *associating*. Other actions that may result in the recited *fixing* are not within the scope of challenged claims 1, 21, and 46, which clearly recite that *fixing* is accomplished by a specific recited action, namely by *associating*.

Dec. on Inst. 15. Accordingly, in our Decision on Institution, we adopted Petitioner's interpretation determining, "the fixing limitations of claims 1, 21, and 46 at least encompass associating at least one parameter of a subset of varying parameters with the first pattern to represent at least one detected condition." *Id.* at 17.

Patent Owner disputes our preliminary interpretation for a number of reasons. We do not agree with Patent Owner's arguments, as discussed below.

a) "Fixing" as "Setting the Scope of Analysis" is Unsupported

> In Patent Owner's Response, Patent Owner argues,
>
> > The BRI of "fixing ... by associating ..." is: "***setting the scope of pattern recognition analysis to where a subset of varying parameters match parameter values associated with said first pattern*** by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition."

PO Resp. 18 (citing Ex. 2004 ¶¶ 27-36, 41-44). Patent Owner further argues, "[t]his construction largely repeats the plain language of the claim and further clarifies that 'fixing' means setting the scope of analysis for pattern recognition." *Id.* Patent Owner points to the use of "fixing" in the '865 patent Specification, where (in the provisional patent application incorporated by reference and to which the '865 patent claims priority) it discloses "[f]ix one subset of variables and identify patterns in a second subset of variable when there is a pattern in the fixed subset of variable." *Id.* (citing Ex. 2001, 15; Ex. 1001, 13:23-26, 13:36-37; Ex. 2004 ¶¶ 27-36). Patent Owner further argues that Petitioner and our Decision on Institution "rely on specification statements such as '[i]n some instances, a subset may be fixed, for example, by associating,'", but contends its proffered interpretation is similarly consistent with that disclosure as well as "all other uses of 'fixing' in the specification," whereas "Petitioner's construction fails to require the result of 'fixing' consistently described by the specification." *Id.* at 19 (citing Pet. 13 (relying

on Ex. 1001, 15:9-12) (alteration in original); Ex. 2004 ¶ 43).

Petitioner replies that Patent Owner's proffered interpretation improperly imports a limitation of dependent claim 3 into the fixing limitation of claim 1 because Patent Owner's assertion that fixing "sets the scope" of analysis for pattern recognition is not an aspect of claim 1 but, instead, arises in claim 3's limitations relating to recognizing a second pattern. Reply 7-8. Petitioner further argues Patent Owner's proffered interpretation of "fixing" finds no support in the '865 patent Specification or in the provisional patent application from which the '865 patent claims priority. Reply 8-11. Specifically, regarding the Specification and the provisional patent application, Petitioner contends "the passages nowhere suggest recognizing a second pattern or setting its scope is required to practice the independent claims." Reply 9.

Patent Owner responds,

> The correctness of [Patent Owner's] construction—and incorrectness of Petitioner's—can be seen by substituting both into the specification passages that describe what "fixing" enables. For example, the '865 Patent states that the act of "fixing one variable associated with or corresponding to 'driving'" results in "an application processor associated with a mobile device" being able to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'"
>
> Substituting in [Patent Owner's] construction, it remains a true statement that "**setting the scope of analysis to where motion state is equal to driving**" enables an application pro-

> cessor to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'" In contrast, merely "**associating the varying parameter motion state with the parameter value driving**" would not enable an application processor to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'"

Sur-reply 7-8 (citations omitted). Patent Owner contends "merely performing the 'associating' without using the 'associating' to set the scope of analysis would not assist subsequent pattern recognition." *Id.* at 8.

We are not persuaded to adopt Patent Owner's proffered interpretation. First, we find nothing in the Specification, including the provisional patent application, that discusses "setting the scope," or even the word "scope" in reference to recognition of a first or second pattern. As noted *supra*, Patent Owner points to the '865 patent Specification and the provisional patent application as supporting its proffered interpretation that "fixing" sets the scope of analysis for later pattern recognition. *See* PO Resp. 18 (citing Ex. 1001, 13:23-26, 13:36-37; Ex. 2001, 15); *see also id.* at 9-10 (citing Ex. 1001, 13:19-22; Ex. 2001, 15). We discern no support for Patent Owner's interpretation in these citations. The cited portions of the '865 patent disclose,

> At least *one subset of variables of interest may be fixed, as discussed above, and one or more patterns in a second subset of variables may be identified, for example, if there is a pattern in the fixed subset of variables.* By way of example but not limitation, an application processor associated with a mobile device may observe what other variables have patterns if a motion

> state corresponds, for example, to "driving," as one possible illustration.
>
> …
>
> For example, fixing one variable associated with or corresponding to "driving" may not be helpful in meaningful pattern identification.

Ex. 1001, 13:19-26, 36-38 (emphasis added). First, the highlighted disclosure merely teaches that patterns (i.e., a "second pattern") may be identified in a second subset of variables *if there is a pattern in the fixed subset of variables*. At best, this indicates that a second pattern may be identified *conditioned on* there being a pattern in the fixed variables. Such a conditional predicate does not expressly or impliedly support that *fixing* means setting the scope of analysis for pattern recognition as in Patent Owner's proffered interpretation. Second, the cited portion reads: "fixed, *as discussed above*," referring to earlier discussions of how a subset of variables may be "fixed." We discern only one earlier discussion in the '865 patent that discloses *how* variables are fixed—specifically disclosing "a condition or event-related pattern may be fixed, for example, by associating corresponding parameters or variable having a particular, distinct, or otherwise suitable pattern to represent the condition or event." Ex. 1001, 8:18-21. Thus, the only earlier, express, disclosure of how variables are "fixed" supports Petitioner's broader interpretation that the fixing limitations are met by "associating" as recited in the claims.

In like manner, the cited portion of the provisional patent application discloses:

- A solution to making this feasible is as follows:
    - Monitor variables individually for patterns

- Fix one subset of variables and identity patterns in a second subset of variables when there is a pattern in the fixed subset of variables
    - E.g., observe what other variables have patterns when motion state corresponds to "driving"
    - For real world situations, a fixed subset of 1 variable might be insufficient (e.g., just fixing "driving" will likely not identify meaningful patterns)
    - The cardinality of the subsets are hence experimental parameters (similar to the value of "k" in a k-Nearest Neighbor classification algorithm)

Ex. 2001, 15 (emphasis added). The preceding page of the exhibit discusses the problem that, "[i]dentifying relevant subsets of variables corresponding to various situations is computationally expensive," and the cited portion of page 15 identifies a possible solution to this problem. *Id.* at 14-15. However, the above-emphasized disclosure merely teaches that patterns are identified in a second subset of variables *when there is a pattern in the fixed subset of variables*. Thus, like the cited portions of the '865 patent Specification, this disclosure merely recites a condition precedent to the identification of a second pattern—the condition that there is a pattern in the first subset of variables. Again, we discern no support for Patent Owner's assertion that *fixing* means setting the scope of analysis.

Moreover, we agree with Petitioner that nothing in independent claim 1 (or independent claims 21 and 46) requires any identification of a second pattern by *fix-*

ing, or by any other technique. Reply 7. The recognition of a second pattern is first recited in claim 3, dependent from claim 1 (as well as claim 22 dependent from claim 21, and claim 47 dependent from claim 46). Furthermore, even the reference to the second pattern in claim 3 (as well as claims 22 and 47) does not rely on the fixing limitations of the base claim but, instead, merely requires that "recognition of a second pattern … [is] based, at least in part, on said first identified pattern." Ex. 1001, 21:18-20. Even claim 4, dependent from claim 3, merely requires that the "second pattern is recognized in a reduced set of varying parameters derived from said monitored input signals in response, at least in part, to said fixing of said subset of varying parameters." *Id.* at 21:21-24. In other words, consistent with the '865 patent Specification, claim 4 merely recites a condition precedent to the recognition of a second pattern—the condition being the fixing of a subset of varying parameters. Although "fixing" is a condition precedent to subsequent pattern recognition, the claim does not require that the second pattern is recognized by the act of *fixing* (e.g., by an action of setting the scope of analysis), but only requires that that the recognition of the second pattern is in response to *fixing* (e.g., chronologically subsequent to *fixing*).

Accordingly, we discern no requirement in the '865 patent claims, Specification, or prosecution history that support Patent Owner's narrower, proffered interpretation requiring the fixing limitations to set the scope of analysis for further pattern recognition.

By contrast, the language of claim 1 (as well as claims 21 and 46) provides clear support for Petitioner's broader, proffered interpretation of *fixing* because the claim was amended to specify that *fixing* is "*by associating* …"—i.e., the fixing limitations are met *by associ-*

ating. The '865 patent Specification further supports Petitioner's broader, proffered interpretation that *fixing* is done by *associating* parameters with a condition. Ex. 1001, 8:18-21 ("Such a condition or event-related pattern *may be fixed*, for example, *by associating* corresponding parameters or variables having a particular, distinct, or otherwise suitable pattern to represent the condition or event." (emphasis added)); *see also id.* at 15:9-12. The prosecution history also makes clear that *fixing* means *associating* parameters with a pattern. Ex. 1002, 40 ("Claims 1, 22, 32, and 48 have been amended to incorporate aspects of former claims 2 and 33, to clarify that '*fixing* a subset of carrying parameters' *is done* '*by associating* at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition.'").

We acknowledge the '865 patent discloses a potential benefit in performing the fixing limitations as improving efficiency of pattern matching. *See* Ex. 1001, 10:29-33 ("As discussed above, identifying a repetitive pattern within a smaller number of variables due, at least in part, to fixing at least one subset of variables of a multi-dimensional information stream, for example, may, therefore, prove beneficial."); *see also id.* at 15:13-17. The '865 patent further discloses complexity problems with using sensors in mobile communication devices,

> These challenges may include, for example, multi-sensor parameter tracking, multi-modal information stream integration, increased signal pattern classification or recognition complexity, background processing bandwidth requirements, or the like, which may be at least partially attributed to a more dynamic envi-

> ronment created by user mobility. Accordingly, how to capture, integrate, or otherwise process multi-dimensional sensor information in an effective or efficient manner for a more satisfying user experience continues to be an area of development.

Id. at 1:51-60. However, the benefit or purpose of performing the fixing limitations cannot override the clear definition of how *fixing* is performed as expressly taught in the claims and the Specification, namely, that *fixing* is done *by associating*.

b) Our Construction Does Not Remove "Fixing" as a Limitation

Patent Owner argues Petitioner's interpretation fails to give meaning to all words of the claim by effectively removing the term *fixing* from the claims. PO Resp. 20-24. Specifically, Patent Owner argues Petitioner's interpretation of *fixing* identifies *associating* as "a specific way to accomplish 'fixing'" but Patent Owner's interpretation identifies *associating* as merely "a specific way of performing a ***substep*** of 'fixing.'" *Id.* at 20. Patent Owner argues that "the 'substep' interpretation is the only defensible interpretation as the claim would be understood by one of ordinary skill in the art ***in the context of the entire disclosure.***" *Id.* at 21 (citing *Translogic*, 504 F.3d at 1257). Patent Owner argues Petitioner's expert (Dr. Allen) agrees that associating is a substep of *fixing* and also a substep of context labeling and, thus, *fixing* is not synonymous with *associating*. *Id.* Patent Owner further argues,

> Petitioner's interpretation is contrary to the specification because merely "associating" does not achieve what the specification repeatedly and consistently describes "fixing" parameters

> of the first pattern as having a particular result … the specification repeatedly and consistently describes "fixing" parameters of the first pattern as enabling the system to identify other patterns that are present when there is a pattern in the fixed variables of the first pattern.

Id. at 21-22 (citing Ex. 2004 ¶¶ 27-30, 32, 43).

We are unpersuaded by Patent Owner's argument. Petitioner's interpretation of *fixing* does not remove the term "fixing" from the claims but, instead, limits the broadest reasonable interpretation to *fixing* "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition" as clearly required by the claims and as consistent with the Specification of the '865 patent.

Furthermore, we find no support in the '865 patent Specification for Patent Owner's contention that "the specification repeatedly and consistently describes 'fixing' parameters of the first pattern as *enabling* the system to identify other patterns that are present when there is a pattern in the fixed variables of the first pattern." PO Resp. 20-21 (emphasis added). Searching the '865 patent Specification as well as the provisional patent application, we find no phrase in which the results of fixing or the act of fixing in some manner *enables* the identification of other patterns. Instead, as discussed *supra*, the disclosures of fixing relate to performing the step of fixing as a condition precedent to the identification of other patterns—i.e., a step, done by associating, to be performed prior to steps to identify other patterns, as in claim 3. However, we are not persuaded that the step of fixing is disclosed as a function whose results are required to identify other patterns (i.e., to

set the scope of analysis for recognizing other patterns).

c) Fixing Is Not The Same As Identifying

Patent Owner contends Petitioner's proffered interpretation of *fixing* "broadens 'fixing …' such that it becomes duplicative of, and is rendered superfluous by, the separately-recited 'identifying' step." PO Resp. 22. Patent Owner argues Petitioner's expert (Dr. Allen) "was unable to identify a meaningful distinction" between the identifying step and Petitioner's interpretation of the fixing limitations. *Id.* at 22-23 (citing Ex. 2003,[8] 56:21-57:6).

We do not agree with Patent Owner's argument. First, neither party proffers an interpretation of the term *identifying* and we discern no reason to interpret the term expressly. In particular, we discern no reason to interpret *identifying* to be the same as our interpretation of *fixing*—namely, "associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Thus, we are not persuaded that Petitioner's interpretation renders *fixing* superfluous as identical to the identifying step.

Second, we acknowledge some confusion in Dr. Allen's deposition testimony responsive to questions regarding distinctions between the identifying steps and the fixing limitations. *See* PO Resp. 22-23 (citing Ex. 2003, 56:21-57:6); *see also* Ex. 2003, 55-59. However, our interpretation of *fixing* is clearly supported by the

[8] Patent Owner's citation refers to "*Id.*," but the prior citation is to Exhibit 1001 when clearly Patent Owner intended to cite to Dr. Allen's deposition testimony in Exhibit 2003. We find the error harmless.

intrinsic evidence and, most importantly, by the claim language per se. The claims clearly recite that *fixing* is "by associating … ." Given such strong support for our interpretation in the claims and similarly strong support in the remaining intrinsic evidence as discussed *supra*, we need not consider conflicting or confusing extrinsic evidence. *See Phillips*, 415 F.3d at 1318 ("Similarly, a court should discount any expert testimony 'that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.'" (quoting *Key Pharms. v. Hercon Labs. Corp.*, 161 F.3d 709, 716 (Fed. Cir. 1998))).

d) Conclusion Regarding Interpretation of "Fixing"

For the above reasons, having considered the parties' arguments and supporting evidence, we determine that it is not necessary to construe the full breadth of the meaning of *fixing*, however, we agree with Petitioner that the broadest reasonable interpretation of *fixing* is at least broad enough to include "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition" as recited in claim 1 and as similarly recited in claims 21 and 46.

D. Anticipation by Wang

Petitioner argues claims 1-4, 15-17, 21-23, 28, 29, 46, and 47 are anticipated by Wang.

1. Overview of Wang (Ex. 1005)

Wang is directed to an Energy Efficient Mobile Sensing System ("EEMSS") that recognizes user states and transitions between user states. Ex. 1005, 1 (col. 1 (Abstract)). Wang's EEMSS "automatically recognizes

a set of users' daily activities in real time using sensors on an off-the-shelf high-end smart phone." *Id.* Wang asserts that then current mobile phones included sensor capabilities such as "WiFi, Bluetooth, GPS, audio, video, light sensors, accelerometers and so on." *Id.* at 1 (col. 2). According to Wang, extracting real-time information from such sensors of a mobile phone enables applications to be better adapted to user preferences and environments. *Id.* ("For instance, it would be much more convenient if our phones can automatically adjust the ring tone profile to appropriate volume and mode according to the surroundings and the events in which the users are participating."). Wang represents a user's context (environment) as a user state based on features derived from the phone's sensors such as motion, location, and background conditions. *Id.*

Wang asserts that determining a user context from such sensors in a mobile phone gives rise to problems of excessive battery power consumption. *Id.* Wang proposes to reduce excessive battery consumption by shutting down sensors that are unnecessary to sense the current or possible next states of the user's mobile device. *Id.* at 2 (col. 1). "EEMSS uses a combination of sensor readings to automatically recognize user state as described by three real-time conditions; namely motion (such as running and walking), location (such as staying at home or on a freeway) and background environment (such as loud or quiet)." *Id.* at 2 (col. 1). A sensor management aspect of EEMSS defines, in an XML formatted file, user states and potential transitions from each state to a next state, and uses that information to turn off sensors not needed for the current state or to detect a transition to any possible next state. *Id.*

2. Analysis of Claims 1, 21, and 46

Claim 1 is an independent method claim. Claims 21 and 46 are independent apparatus and article of manufacture claims, respectively, reciting essentially the same limitations as the method steps of claim 1. We consider claim 1 as representative of these three claims. *See Accenture Global Servs. GmbH v. Guidewire Software, Inc.*, 728 F.3d 1336, 1341 (Fed. Cir. 2013) ("Although [*CLS Bank Int'l v. Alice Corp.*, 717 F.3d 1269 (Fed. Cir. 2013) (en banc)] issued as a plurality opinion, in that case a majority of the court held that system claims that closely track method claims and are grounded by the same meaningful limitations will generally rise and fall together." *Id.* at 1274 n.1 (parenthetical omitted)); *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 226-227 (2014) ("Put another way, the system claims are no different from the method claims in substance.").

Petitioner largely focuses on Wang's Table 1, reproduced below with Petitioner's color annotations.

State Name	Parameters Values State Features			Sensors Monitored
	Location	Motion	Background Sound	
Working	Office	Still	Quiet	Accelerometer, Microphone
Meeting	Office	Still	Speech	Accelerometer, Microphone
Office_loud	Office	Still	Loud	Accelerometer, Microphone
Resting	Home	Still	Quiet	Accelerometer, Microphone
Home_talking	Home	Still	Speech	Accelerometer, Microphone
Home_entertaining	Home	Still	Loud	Accelerometer, Microphone
Place_quiet	Some Place	Still	Quiet	Accelerometer, Microphone
Place_speech	Some Place	Still	Speech	Accelerometer, Microphone
Place_loud	Some Place	Still	Loud	Accelerometer, Microphone
Walking	Keep on changing	Moving Slowly	N/A	GPS
Vehicle	Keep on changing	Moving Fast	N/A	GPS

Conditions — Example Pattern — Information Sources

Table 1: The states and their features captured by our system (EEMSS).

Pet. 18. According to Petitioner, Wang's Table 1, reproduced above with Petitioner's annotations in color, shows a first column in which a "State Name" corresponds to a "condition" as claimed (annotated in red), a

last column in which "Sensors Monitored" for a given State Name correspond to "information sources" as claimed (annotated in orange), and columns between the first and last columns in which each of three "State Features" ("Location," Motion," and "Background Sound") correspond to "parameter values" (annotated in green). Pet. 17. Petitioner annotates in blue an exemplary "pattern," as claimed, having specific parameter values for the State Features of the state named "Vehicle." *Id.*

Petitioner argues Wang teaches all elements of independent claims 1, 21, and 46. Pet. 19-28. Several elements of claims 1, 21, and 46, as identified in Wang by Petitioner, are undisputed by Patent Owner but other elements are disputed. Below, we address the undisputed elements followed by a discussion of the disputed elements.

a) Undisputed Elements - "monitoring" and "detecting"

Regarding method claim 1, Petitioner identifies the method step of *monitoring input signals* as Wang's monitoring of sensor values and readings from sensors of a smart phone—sensors such as accelerometer, WiFi detector, GPS, and microphone. Pet. 20-21 (citing Ex. 1005, 2, 5, Abstract; Ex. 1003 ¶¶ 118-19). Petitioner identifies the method step of *detecting a condition* based, at least in part, on the monitored input signals as Wang's determination of a user's state based on the sensor readings. Pet. 21-22 (citing Ex. 1005, 2). Specifically, Wang discloses,

> In our EEMSS implementation, the state description subsystem currently defines the following states: "Walking", "Vehicle", "Resting", "Home_talking", "Home_entertaining",

> "Working", "Meeting", "Office_loud", "Place_quiet", "Place_speech" and "Place_loud". All these states are specified as a combination of built-in Nokia N95 sensor readings. The sensors used to recognize these states are accelerometer, WiFi detector, GPS, and microphone.

Id. (quoting Ex. 1005, 2). Petitioner notes the similar disclosure of the '865 patent teaching "walking" and "driving" as exemplary conditions detected based on monitored input signals. Pet. 21 (citing Ex. 1001, 7:40-45). Petitioner further notes that Wang also refers to its states as "conditions." Pet. 21 (citing Ex. 1005, 2 ("EEMSS uses a combination of sensor readings to automatically recognize user state as described by three real-time *conditions*; namely motion …, location … and background environment") (emphasis added)).

Patent Owner does not dispute Petitioner's identification of the monitoring and detecting steps in the teachings of Wang. Having reviewed the parties' arguments and supporting evidence in the complete trial record, we are persuaded Wang teaches the monitoring and detecting steps of claims 1 (as well as related recitations of claims 21 and 46).

We turn next to Patent Owner's dispute regarding the identified teachings of Wang as Petitioner applies them to the identifying and fixing steps of claim 1 (as well as related limitations of claims 21 and 46). Patent Owner argues: (1) Wang recognizes states and state transitions through XML definitions, which is different than recognizing (identifying) patterns based on collections of parameter values (PO Resp. 24-33); (2) based on Patent Owner's proposed constructions, Wang does not teach the identifying element of the claims (*id.* at

33-35); and (3) Wang does not disclose "fixing" under Patent Owner's interpretation of "fixing" or under Petitioner's interpretation of the term (*id.* at 35-38). We address these arguments below.

b) Wang Teaches Identifying a First Pattern

A first disputed element of claims 1, 21, and 46 arises in Petitioner's mapping of the identifying step to the teachings of Wang. Claim 1 recites "identifying a first pattern based, at least in part, on said at least one detected condition." Claims 21 and 46 each include a similar recitation.

Petitioner argues Wang's Table 1 discloses identifying a pattern based on a condition. Pet. 22-24. Wang's Table 1, with Petitioner's color annotations, is reproduced below.

State Name	State Features			Sensors Monitored
	Location	Motion	Background Sound	
Working	Office	Still	Quiet	Accelerometer, Microphone
Meeting	Office	Still	Speech	Accelerometer, Microphone
Office_loud	Office	Still	Loud	Accelerometer, Microphone
Resting	Home	Still	Quiet	Accelerometer, Microphone
Home_talking	Home	Still	Speech	Accelerometer, Microphone
Home_entertaining	Home	Still	Loud	Accelerometer, Microphone
Place_quiet	Some Place	Still	Quiet	Accelerometer, Microphone
Place_speech	Some Place	Still	Speech	Accelerometer, Microphone
Place_loud	Some Place	Still	Loud	Accelerometer, Microphone
Walking	Keep on changing	Moving Slowly	N/A	GPS
Vehicle	Keep on changing	Moving Fast	N/A	GPS

Condition Pattern

Table 1: The states and their features raptured by our system (EEMSS).

Pet. 23. Wang's Table 1, reproduced above with Petitioner's annotations in color and as described in further detail *supra*, depicts a first column as "State Name," the next three columns, collectively, representing "State Features" comprising three features—"Location," "Motion," and "Background Sound," and a last column representing "Sensors Monitored" during the corresponding state. The last two rows of Table 1 depict the exemplary user states named "Walking" and

Vehicle" and the associated values for the corresponding State Features of each state. Based on Wang's Table 1, as annotated above, and based on Petitioner's proffered interpretation of a "pattern," Petitioner argues "Wang discloses such a pattern or collection of parameter values for a user state. For example, Wang discloses that a pattern [(annotated in blue comprising parameter values annotated in green)] based on the 'Walking' user state [(a "condition" annotated in red)] is 'Location' = 'Keep on changing' and 'Motion' = 'Moving Slowly.'" Pet. 22-23. Petitioner further argues Table 1 "discloses a wide variety of patterns (collections of parameter values), each based on a different user state or condition." Pet. 23. Petitioner contends "Wang discloses that the patterns are learned in a training phase of a 'classification algorithm;' where the classification algorithm later performs condition detection by recognizing user states (i.e., conditions) if the sensor readings matches respective collection of parameter values (i.e., the patterns), e.g., as shown in Table 1." Pet. 24 (citing Ex. 1005, 4, 5; Ex. 1003 ¶¶ 123-27). More specifically, Dr. Allen testifies,

> Note that the pattern is "based on" a detected condition because the parameter values comprising the pattern are chosen based on real-world measurements that are associated with the condition during the training phase as Wang discloses that "In this phase of system configuration we also design and test **classification algorithms that recognize user status based on different sensor readings. These classification algorithms are pretrained based on extensive experiments conducted by researchers.**" [Ex. 1005, 4]. That is, the parameters are not chosen arbitrarily, but are instead

> selected or learned in a training phase of a "classification algorithm" to accurately represent the conditions. This allows for accurate detection of conditions where the classification algorithm later performs condition detection by recognizing user states (i.e., conditions) when the sensor readings match the respective collection of parameter values (i.e., the patterns), e.g., as shown in Table 1.

Ex. 1003 ¶ 126.

Patent Owner argues Wang discloses user states and transitions between those states defined according to rules in an XML style description such that each state is defined in terms of the current/prior state and a transition to a next state and, thus, is "incompatible with the challenged claims." PO Resp. 24-25 (citing Ex. 1005, 1; Ex. 2004 ¶¶ 50-51). Patent Owner further argues that Petitioner's reliance on Wang's Table 1 is misplaced because,

> Importantly, Wang does not disclose EEMSS using the combination of "State Features" and corresponding values that Petitioner relies upon as purported patterns. Rather, the portions of Table 1 to which Petitioner points represent an ***alternative*** way to define a state as compared to the actual information contained in the XML state descriptor file used by EEMSS. As an example, while Petitioner asserts that a state "Vehicle" is defined by a pattern of Feature "Location" = "Keep on changing" + Feature "Motion" = "Moving Fast", that is not what Wang actually discloses. Instead, Wang explains that EEMSS defines "Vehicle" as the combination of being in the state "Walking"

> and a state transition being detected: "If a significant amount of increase is found on both user speed and recent distance of travel, a state transition will happen and the user will be considered riding a vehicle."

PO Resp. 27 (citations omitted) (citing Ex. 2004 ¶¶ 53-54; Ex. 1005, 5).

> Specifically, Dr. Villasenor testifies,
>
> While Table 1 describes a way to "define" states, Wang does not disclose using those definitions in the EEMSS system. That is, Wang defines states in two different ways—based on the groups of "State Features" and linked values shown in Table 1, but separately based on the current state and a state transition—but only describes EEMSS using one the latter definition.

Ex. 2004 ¶ 53. Dr. Villasenor further testifies that Wang's Figure 3 discloses that Wang uses XML state descriptors and "does not include 'state features' and values as listed in Table 1" and, thus, "it is not possible for EEMSS to use" the information in Table 1. *Id.* ¶ 54. In other words, Patent Owner contends that Wang does not disclose identifying a pattern based on one or more conditions, as Petitioner argues is taught by Wang's Table 1, but, instead, determines a next state based on the XML state descriptor of a current state and corresponding possible transitions to other states. *See* PO Resp. 33-34 ("***Wang never discloses the EEMSS system using collections of state features from Table 1 to identify state.***"); *see also id.* at 34 ("Wang consistently explains that the EEMSS system uses the XML state descriptor file, which defines states based on prior state and state transition."); Sur-reply

16 ("Moreover, a simple word search for 'Table 1' makes clear Wang never says that EEMSS uses 'Table 1.'").

Petitioner replies that Patent Owner "ignores Wang's numerous, express disclosures of EEMSS defining/detecting user states '***as well as***' state transitions." Reply 20. Petitioner argues that Wang's use of XML state descriptors and corresponding transitions is not mutually exclusive with Wang's use of Table 1. Reply 21. Petitioner contends that Wang repeatedly discloses using the data in Table 1, noting the title of Table 1 ("The states and their features captured by our system (EEMSS)") and the disclosure that "Table 1 illustrates the set of ***user states to be recognized by EEMSS*** and three characteristic ***features that define*** each of these ***states***." Reply 22 (citing Ex. 1005, 5, 6).

Furthermore, Petitioner argues that Dr. Villasenor's testimony pointing to Wang's Figure 3 as disclosing *only* usage of the XML state descriptors "glosses over Wang's accompanying description of Fig. 3 and jumps to the unsupported conclusion that 'the XML state descriptor file does not include "state features" and values as listed in Table 1.'" Reply 22-23 (citing Ex. 2004 ¶¶ 53-54). Petitioner further argues that Wang's description of Figure 3 shows "that the EEMSS implementation includes a 'classification module [that] returns user activity and position feature such as "moving fast", "walking", "home wireless access point detected" and "loud environment" [i.e., state features in Table 1] by running classification algorithms on processed sensing data.'" *Id.* (quoting Ex. 1005, 6).

In response, Patent Owner argues that Wang does not disclose the use of ***both*** Table 1 and XML state descriptors, and further argues that Wang's use of XML

state descriptors and associated transitions, rather than information in Table 1, fails to disclose identifying a pattern as claimed. Sur-reply 14-19. Furthermore, Patent Owner argues "the original Petition does not include any mapping of the claimed 'first pattern' or 'second pattern' to the XML file; Petitioner relied exclusively on Table 1" and, thus, Petitioner's arguments in its Reply asserting use of XML ***as well as*** Table 1 are untimely. *See id.* at 19-20 (citing Pet. 17-18, 22-25, 29-31).

(1) Wang's Table 1 Teaches the "Identifying" Step

We are persuaded by Petitioner's arguments that Wang's Table 1, and associated disclosures in Wang, disclose the step of "identifying a first pattern based, at least in part, on said at least one detected condition." In particular, we are persuaded by Petitioner's argument that,

> Wang discloses monitoring one or more input signals from built-in sensors associated with a mobile device including an "accelerometer, WiFi detector, GPS, and microphone." [Ex. 1005, 3]. At least one user state (i.e., condition) is detected based on at least one of the monitored sensors (i.e., information sources). [Ex. 1005, 3]. ***Each user state has "characteristic features defining that state" (i.e., parameter values), which collectively form patterns to be identified by the EEMSS.*** [Ex. 1005, 5]. ***Wang provides, in its Table 1, a "set of user states to be recognized by EEMSS and three characteristic features that define each of these states.***" [*Id*].

Pet. 17 (emphasis added). Moreover, we are also persuaded by Petitioner's detailed explanation (as dis-

cussed *supra*) of how Wang's Table 1 discloses the recited step of identifying a first pattern. Pet. 22-24 (citing Ex. 1005, 4, 5; Ex. 1003 ¶¶ 123-27). Accordingly, Petitioner has identified with particularity the elements of Wang, e.g., Table 1, that teach the identifying step.

In essence, Patent Owner's argument regarding Wang reduces to an assertion that Wang does not *expressly* state that the EEMSS *uses* Table 1 in state recognition and transition processing. We do not agree with Patent Owner's argument. Wang refers frequently to the "user states" and the "features" that define these states, as depicted in Table 1 and as used by EEMSS. *See*, *e.g.*:

> (1) While user's context information can be represented in multiple ways, in this paper we focus on using user state as an important way to represent the context. User state may contain a combination of features such as motion, location and background condition that together describe user's current context. Ex. 1005, 5;
>
> (2) EEMSS uses a combination of sensor readings to automatically recognize user state as described by three real-time conditions; namely motion (such as running and walking), location (such as staying at home or on a freeway) and background environment (such as loud or quiet). *Id.* at 2;
>
> (3) In our EEMSS implementation, the state description subsystem currently defines the following states: "Walking", "Vehicle", "Resting", "Home talking", "Home entertaining", "Working", Meeting", "Office loud", "Place quiet", "Place speech" and "Place loud." *Id.* at 2;

(4) Table 1 illustrates the set of user states to be recognized by EEMSS and three characteristic features that define each of these states. The three features are the location, motion and background sound information. The list of sensors necessary to detect these three features are also shown in Table 1. *Id.* at 5;

(5) Here we select one of the user states (Walking) and illustrate how the state transition is detected when the user is walking outdoor. Figure 2 shows the hierarchical decision rules." (and the discussion that follows describing the transition from a Walking user state to a Vehicle user state as depicted in Figure 2). *Id.* at 5;

(6) The classification module returns user activity and position feature such as "moving fast", "walking", "home wireless access point detected" and "loud environment" by running classification algorithms on processed sensing data. *Id.* at 6;

(7) EEMSS automatically records the predicted user state using the three discriminating features: motion, location and background sound."), 11-12 (Figure 9, Table 7, and the associated description in section 7.2.2 of Wang discuss accuracy of the user state recognition of user states as shown in Table 1. *Id.* at 10.

Each of the above citations refers to the implemented user states illustrated in Wang's Table 1. In view of these numerous references to the exemplary user states and associated features illustrated in Wang's Table 1, Patent Owner's assertion, supported by Dr. Villasenor, that Wang does not use Table 1 to identify states is not credible. Based on Wang's frequent reference to the information illustrated in Table

1, including those identified by Petitioner (Pet. 17, 22-24), we determine that Wang's implementation uses the states and features illustrated in Table 1 to recognize/identify a pattern as claimed (a particular set of feature values illustrated in Table 1), based on a condition (the corresponding present user state represented in Table 1).

It is true that there is no particular algorithm, program code, or data structure that discloses precisely how Table 1 is used. However, the claims do not require any particular data structure, algorithm, or programmed instructions. Claim 1 merely requires that the first pattern be identified "based, at least in part, on said at least one detected condition." Wang's frequent reference to the information illustrated in Table 1 and use of that information (feature values) to determine a user state sufficiently teaches the ordinarily skilled artisan the claimed identifying step, as discussed by Dr. Allen. *See*, *e.g.*, Ex. 1003 ¶¶ 105-107.

Accordingly, we find that Wang teaches the identifying step because Table 1 illustrates the exemplary states recognized (identified) by EEMSS along with the patterns (State Features) used to identify the states.

(2) Wang's XML State Descriptors Are Not a Mutually Exclusive Alternative to Table 1

In view of our determination that Wang's Table 1, and associated disclosures regarding the information illustrated therein, teaches the identification of a first pattern (the identifying step) as claimed, we need not consider the parties' disputes regarding how or whether Wang ***also*** uses the XML state descriptors. However, even considering Wang's disclosures relating to the XML state descriptors, we disagree with Patent Owner's assertion that "the portions of Table 1 to which Pe-

titioner points represent an ***alternative*** way to define a state as compared to the actual information contained in the XML state descriptor file used by EEMSS." PO Resp. 27 (citing Ex. 2004 ¶¶ 53-54); *see also id.* at 33-34. Patent Owner is correct that Wang uses XML state descriptors to define states and transitions between states, but Patent Owner has not shown persuasively that the XML usage in Wang is a mutually exclusive alternative to the information in Table 1.

Wang teaches that the XML encoding of states and transitions is a useful format for a user to define the various states and associated transitions, which are then applied as input to EEMSS. Wang discloses,

> ***As such we select a set of states that describe the user's daily activities and have defined the state and sensor relationships in XML using the format introduced in Section 3. Table 1 illustrates the set of user states to be recognized by EEMSS and three characteristic features that define each of these states.*** The three features are the location, motion and background sound information. The list of sensors necessary to detect these three features are also shown in Table 1.

Ex. 1005, 5 (emphasis added).

We discern that the XML state descriptors (in an XML file) and the information in Table 1 are not mutually exclusive alternative approaches to the operation of Wang's EEMSS; rather, XML encoding is an aspect of the single, exemplary, prototype embodiment disclosed by Wang in which the selected set of states to be recognized are defined by a user/designer encoding the state and sensor relationships in XML, which is then applied as input to Wang's EEMSS system. *See id.*

Table 1 then "illustrates the set of user states to be recognized by EEMSS and three characteristic features that define each of these states." *See id.* Wang further confirms that the XML file (XML state descriptors) is provided as input to the system to define user states and transition rules (i.e., a "sensor management scheme"). Ex. 1005, 2 ("This state descriptor is taken as an input and is used by our sensor assignment functional block to turn sensors on and off based on a user's current condition."), 6 ("[s]ystem reads in the XML state descriptor which contains the sensor management scheme").

Furthermore, Wang's section 3 discloses the XML format employed by a user, but shows only the general style/format of such user defined descriptors, without reference to any specific states to be recognized in the implementation, specific sensors to be used in recognizing the implemented user states, or actual feature values that may cause a state transition as implemented in the EEMSS prototype and as illustrated in Table 1. *See* Ex. 1005, 3-4 (referring only to generic exemplary states "State1," "State2," and "State3," and exemplary sensors "Sensor1," Sensor2," and "Sensor3"). Rather, Wang's section 3 merely describes a general format for such user input, and expressly discloses advantages of using XML for defining the information that, as actually implemented, is illustrated in Table 1:

> There are three major advantages of using XML as the format of state descriptor. First, XML is a natural language to represent states in a hierarchical fashion. Second, new state descriptors can be added and existing states can be modified with relative ease even by someone with limited programming experience. Finally, XML files are easily parsed by modern pro-

gramming languages such as Java and Python thereby making the process portable and easy to implement.

Ex. 1005, 4. Wang's Figure 1 describing the XML format to be used for defining states and transitions is reproduced below.

```
<StateDescriptor>
  <State>
    <StateName> state1 </StateName>
    <Sensor>
      <SensorName> sensor1 </SensorName>
      <Case>
        <Condition> sensor reading 1</Condition>
        <NextState> State2 </NextState>
      </Case>
      <Case>
        .
        .
      </Case>
    </Sensor>
    <Sensor>
      .
      .
    </Sensor>
  </State>
  <State>
   <StateName> state2 </StateName>
    <Sensor>
      <SensorName> sensor2 </SensorName>
      <Case>
        <Condition> sensor reading 2</Condition>
        <Sensor>
          <SensorName> sensor3 </SensorName>
          <Case>
            <Condition> sensor reading 3</Condition>
            <NextState> State1 </NextState>
          </Case>
          <Case>
            <Condition> sensor reading 4</Condition>
            <NextState> State3 </NextState>
          </Case>
        </Sensor>
      </Case>
      <Case>
        .
        .
      </Case>
    </Sensor>
    <Sensor>
      .
      .
    </Sensor>
  </State>
  .
  .
</StateDescriptor>
```

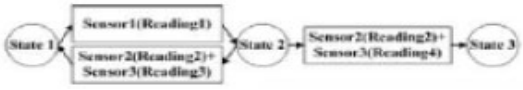

Figure 1: The format of XML based state descriptor and its implication of state transition.

Ex. 1005, 1. As noted *supra*, Wang's Figure 1 describes only the "general format" for defining state descriptors using XML by an example of three states ("State1," "State2," and "State3")—not actual states recognized

by the prototype EEMSS—and does not describe transitions between any actual, implemented, recognized states based on the readings from three hypothetical sensors ("Sensor1," "Sensor2," and "Sensor3"). Ex. 1005, 3-4. By contrast, with the generalized format for state descriptors unrelated to the specific examples of user states in Wang's prototype implementation, Table 1 of Wang discloses specific examples of states recognized by the actual implementation of the prototype EEMSS. *See* Ex. 1005, 5. Section 4 of Wang discloses user states as actually implemented within the prototype embodiment of EEMSS in Table 1. *Id.* at 5-6 (referring to user states and associated characteristic features implemented in the EEMSS prototype). Distinct from the generic states disclosed in XML format state descriptors ("State1," "State2," and "State3"), actual implemented user states recognized by EEMSS include: "Working," "Meeting," "Office_loud," "Resting," "Home_talking," "Home_entertaining," "Place_quiet," Place_speech," "Place_loud," "Walking," and "Vehicle." *Id.* at 5-6 ("Table 1 illustrates the set of user states to be recognized by EEMSS and three characteristic features that define each of those states.").

Accordingly, we find that Wang teaches the identifying step because Wang's XML state descriptors are a useful format for defining the states that are in Table 1, and Table 1 illustrates exemplary states recognized (identified) by EEMSS along with the patterns (State Features) used as the basis to identify the states.

c) Wang Teaches the Fixing Limitations

The remaining dispute arises regarding Petitioner's mapping of the fixing step to the teachings of Wang. Claim 1 recites, "fixing a subset of varying parameters associated with said first pattern by associat-

ing at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition, said varying parameters derived, at least in part, from said monitored input signals." Claims 21 and 46 include a similar recitation.

Based on Petitioner's interpretation of "fixing," an interpretation we adopt, we agree with Petitioner that Wang teaches the fixing limitations of claims 1, 21, and 46. Pet. 24-28. Specifically, in accord with Petitioner's proffered construction of the fixing limitations, Petitioner contends "Wang discloses th[ese] limitation[s] by associating a subset of 'state features' (i.e., parameters) with a pattern to represent a user state (i.e., condition)." Pet. 24. Petitioner further contends that Wang's Table 1 discloses a set of states that can be recognized by sensors providing location, motion, and background sound. Pet. 24-25 (citing Ex. 1005, 5). Petitioner argues Wang's Table 1 discloses the fixing limitation because a user state (e.g., "Walking") is represented by a pattern of parameter (state feature) values, in which state feature "Location" is detected as "Keep on changing," and state feature "Motion" is detected as "Moving Slowly." Pet. 25 (citing Ex. 1003 ¶¶ 128-31). Petitioner's annotations to Wang's Table 1, reproduced above, identifiy the "Walking" state as a condition, as recited in the claims, and identifies the feature values for "Location," "Motion," and "Background Sound" as the recited first pattern. *Id.* Petitioner further notes that Wang's "Walking" state is represented by a subset of the features—namely, "Location" and "Motion," and excluding "Background Sound." *Id.* Petitioner also contends the "varying parameters [are] derived, at least in part, from said monitored input signals" as claimed because, for example, Wang discloses using only the GPS input signal to derive the varying parame-

ters of location and motion. Pet. 25-26 (citing Ex. 1005, 5, 8). In like manner, Petitioner contends that Wang discloses using signals derived from an accelerometer and a microphone for deriving varying parameters for motion and background sound, respectively. Pet. 27-28.

Patent Owner argues Wang fails to teach the step of "fixing … by associating …" under Patent Owner's construction of "fixing" that requires "setting the scope of pattern recognition analysis to where a subset of varying parameters match parameter values associated with said first pattern." PO Resp. 37-38. We do not agree with this argument because, as discussed *supra*, we do not adopt Patent Owner's unduly narrow interpretation of "fixing."

Patent Owner also argues, Wang fails to disclose this step even under Petitioner's interpretation of "fixing," because, as with the identifying step above, "Wang never discloses using the 'state features' of Table 1 as part of EEMSS, and those values are not included in XML state descriptor file that EEMSS uses." PO Resp. 36.

For the reasons discussed *supra*, we are not persuaded that Wang fails to disclose using the information illustrated in Table 1. As discussed supra (Section II.C.3), the claim clearly defines "fixing" as being done "***by associating*** …," without requiring any additional steps (or substeps) to achieve the alleged ultimate goal or purpose of "fixing" (e.g., setting the scope of analysis). In other words, as clearly defined by the context of the claims, "fixing" broadly encompasses fixing by associating as identified by Petitioner and under this interpretation and, thus, we agree with Petitioner that Wang teaches the fixing limitations:

> As can be seen in Table 1, to represent a condition or user state— in this case "Walking"—the EEMSS associates the parameters "Location" and "Motion" with the corresponding pattern (the collection of parameters values "Location" = "Keep on changing" and "Motion" = "Moving Slowly") to represent the condition "walking." Of note, no value is fixed for "Background Sound"; instead, only a subset of varying parameters ("Location" and "Motion") are associated with the pattern. Accordingly, Wang discloses the fixing limitation because it discloses associating a subset of parameters ("Location" and "Motion") with a pattern ("Keep on changing" together with "Moving Slowly") to represent a condition ("Walking").

Pet. 25 (citations omitted) (citing Ex. 1005, 5; Ex. 1003 ¶¶ 128-131).

For the above reasons, we are persuaded, based on our interpretation of "fixing," that Wang teaches the step of "fixing a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition, said varying parameters derived, at least in part, from said monitored input signals."

d) Conclusion Regarding Obviousness of Claims 1, 21, and 46

For the reasons discussed above, we are persuaded that Wang teaches every element of claim 1. Patent Owner does not separately argue independent claims 21 and 46, apart from the arguments directed to claim 1. *See generally* PO Resp. For similar reasons to claim 1,

we are persuaded that Wang teaches all elements of claims 21 and 46. *See* Pet. 15-29.

Having reviewed the parties' arguments and supporting evidence, we are persuaded that Petitioner has proven by a preponderance of the evidence that independent claims 1, 21, and 46 are unpatentable as anticipated by Wang.

3. Analysis of Claims 3, 4, 22, and 23

Claim 3 depends from claim 1 and further recites "initiating a process to attempt a recognition of a second pattern in connection with said monitoring said input signals based, at least in part, on said first identified pattern." Claim 22 depends from claim 21 and recites a similar limitation to that of claim 3.

Claim 4 depends from claim 3 and further recites "wherein said second pattern is recognized in a reduced set of varying parameters derived from said monitored input signals in response, at least in part, to said fixing of said subset of varying parameters." Claim 23 depends from claim 22 and recites a similar limitation to that of claim 4. Petitioner argues that Wang teaches the limitations of claims 3 and 22 (Pet. 29-31) and that Wang teaches the further limitations of claims 4 and 23 (Pet. 31-39).

Specifically, with respect to claim 3 (and claim 22), Petitioner argues that Wang recognizes a second pattern, based on a first pattern, because when Wang detects a significant increase in both speed and distance of a user's movement, Wang changes the user state from Walking to Vehicle. Pet. 30-31 (citing Ex. 1005, 5, Fig. 2). Petitioner contends,

> Namely, upon identifying the first pattern of "Location" = "Keep on changing" plus "Mo-

> tion" = "Moving Slowly," the mobile device monitors only GPS inputs. [Ex. 1005, 6 (Table 1)]. If the device then observes that "Motion" changes to "Moving Fast," it recognizes the second pattern of "Location" = "Keep on changing" plus "Motion" = "Moving Fast." *Id.* This second pattern corresponding to the condition of "Vehicle" is recognized. *Id.*

Pet. 31 (citing Ex. 1003 ¶¶ 144-148). Patent Owner does not dispute Petitioner's arguments regarding claim 3 (or claim 22) aside from the above arguments directed to claim 1 (and 21).

Regarding the further limitation of claim 4 (and 23), Petitioner argues "Wang discloses that the second pattern (e.g., the collection of parameter values corresponding to the condition of 'riding a vehicle') is recognized in a reduced set of varying parameters (e.g., 'Motion' and 'Location') derived from the monitored input signals (among others, the GPS signal)." Pet. 33 (citing Ex. 1005, 5; Ex. 1003 ¶¶ 149-158).

Patent Owner argues that Petitioner's identification of Wang's teachings relates to the detecting step and not the fixing step, and contends that "selecting which sensors are monitored '***has nothing to do with fixing***'" and, thus, "recognizing a second pattern based on that selection of sensors cannot be 'in response' or 'due,' even in part, to said fixing." PO Resp. 39-40 (quoting Ex. 2003,[9] 91:11-16). Patent Owner further contends, "the Petition fails to describe any ***causal*** relationship between the purported fixing (i.e., 'associat-

[9] Patent Owner erroneously cites "Ex. 1003" although the quotation relates to the deposition testimony at Exhibit 2003. Patent Owner's typographic error is deemed harmless.

ing') and specifying of sensors to be monitored." *Id.* at 40; *see also* Sur-reply 27.

Petitioner replies,

> To eliminate all doubt concerning the actual claim features, however, to the extent a "causal relationship" must exist between the fixing and a reduction in varying parameters, Wang discloses exactly such a causal relationship because "[t]he set of varying parameters used to attempt recognition of the second pattern is reduced in response to the fixing of the subset of varying parameters …."

Reply 35 (citing Pet. 37).

We are not persuaded by Petitioner's argument. We agree with Patent Owner that Petitioner has failed to show where Wang teaches that the second pattern is recognized from a set of parameters that is reduced "in response to" (or due to) the fixing step. As discussed *supra*, based on Petitioner's interpretation of "fixing," an interpretation we essentially adopt, we agree with Petitioner that, "Wang discloses the fixing limitation because it discloses associating a subset of parameters ('Location' and 'Motion') with a pattern ('Keep on changing' together with 'Moving Slowly') to represent a condition ('Walking')." *See* Section II.D.2.c (quoting Pet. 25 (citing Ex. 1005, 5; Ex. 1003 ¶¶ 128-131)). Although we agree with Petitioner that a second pattern (second user state) may be recognized from a reduced set of variables—i.e., monitoring only GPS to detect the difference between Walking and Vehicle user states—Petitioner has not persuaded us that the reduction of the number of parameters is "in response to" the fixing step. In other words, the "fixing" step is identified in Wang by Petitioner as merely "associating a subset of

parameters ('Location' and 'Motion') with a pattern ('Keep on changing' together with 'Moving Slowly') to represent a condition ('Walking')." Petitioner has not identified a teaching in Wang that the reduction in parameters used to recognize a next state is in response to this "associating" function. Petitioner's Reply quoting from page 37 of the Petition does not explain how the reduction in parameters is tied to the earlier association of the fixing step.

For the above reasons, having reviewed the parties' arguments and supporting evidence, we are persuaded that Petitioner has proven by a preponderance of the evidence that claims 3 and 22 are unpatentable as anticipated by Wang, however, we are *not* persuaded that Petitioner has proven by a preponderance of the evidence that claims 4 and 23 are unpatentable as anticipated by Wang.

4. Analysis of Dependent Claims 2, 15-17, 28, 29, and 47

Claims 2 and 15-17 depend from claim 1, claims 23, 28, and 29 depend from claim 21, and claim 47 depends from claim 46. Petitioner identifies the limitations of these claims in Wang. Pet. 28-31, 38-41. Patent Owner does not dispute Petitioner's arguments regarding claims 2, 15-17, 28, 29, and 47 apart from the above arguments directed to claims 1, 21, and 46.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that claims 2, 15-17, 28, 29, and 47 are unpatentable as anticipated by Wang. *See* Pet. 28-31, 38-41.

5. Conclusion Regarding Anticipation by Wang

For the above reasons, we are persuaded that Petitioner has proven by a preponderance of the evidence that claims 1-4, 15-17, 21-23, 28, 29, 46, and 47 are unpatentable as anticipated by Wang.

E. Obviousness over Wang and Nadkarni

Petitioner argues dependent claims 5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, and 51-53 are unpatentable as obvious over the combination of Wang and Nadkarni. Pet. 47-69. Dependent claims 5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, and 51-53 depend, directly or indirectly, from one of independent claims 1, 21, and 46. Petitioner argues Wang and Nadkarni are in the same field of endeavor, argues both Wang and Nadkarni are pertinent to the problem addressed by the '865 patent, and articulates reasons for the proposed combination of Wang and Nadkarni. Pet. 42-47. Patent Owner does not separately dispute Petitioner's arguments directed to these claims apart from Patent Owner's arguments directed to claims 1, 21, and 46.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded that Petitioner has proven by a preponderance of the evidence that dependent claims 5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, and 51-53 are unpatentable as obvious over the combination of Wang and Nadkarni. *See* Pet. 41-69.

F. Obviousness over Wang, Nadkarni, and Greenhill

Petitioner argues dependent claims 12-14 are unpatentable as obvious over the combination of Wang, Nadkarni, and Greenhill. Pet. 74-77. Dependent claims 12-14 depend indirectly from independent claim 1. Petitioner articulates reasons for the proposed combination of Wang, Nadkarni, and Greenhill. Pet. 69-74. Pa-

tent Owner does not separately dispute Petitioner's arguments directed to these claims apart from Patent Owner's arguments directed to claim 1.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded that Petitioner has proven by a preponderance of the evidence that dependent claims 12-14 are unpatentable as obvious over the combination of Wang, Nadkarni, and Greenhill. *See* Pet. 69-77.

III. CONCLUSION[10]

For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1-3, 5, 6, 8-22, 24, 25, 27-30, 46-49, and 51-53 of the '865 patent are unpatentable. We further determine that Petitioner has *not* shown by a preponderance of the evidence that claims 4 and 23 are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), claims 1-3, 5, 6, 822, 24, 25, 27-30, 46-49, and 51-53 of U.S. Patent No. 8,768,865 B2 are held unpatentable;

---

[10] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2) (2012).

FURTHER ORDERED that claims 4 and 23 are *not* held unpatentable; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1, 4-6, 8, 9, 11-13, 16, 20, 22-24, 26-28, 30, 31	102	Wang	1-3, 15-17, 21, 22, 28, 29, 46, 47	4, 23
5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, 5153	103	Wang, Nadkarni	5, 6, 8-11, 18-20, 24, 25, 27, 30, 48, 49, 51-53	
12-14	103	Wang, Nadkarni, Greenhill	12-14	
Overall Outcome			1-3, 5, 6, 822, 24, 25, 27-30, 46-49, 51-53	4, 23

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APPENDIX D

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

IPR2018-01282
Patent 8,768,865 B2

APPLE INC.,
Petitioner,
v.

QUALCOMM INCORPORATED,
Patent Owner.

Paper 34
Date: February 24, 2020

Before
DANIEL N. FISHMAN, MICHELLE N. WORMMEESTER, and AMANDA F. WIEKER,
Administrative Patent Judges.
FISHMAN, *Administrative Patent Judge*

JUDGMENT
FINAL WRITTEN DECISION
Determining Some Challenged Claims Unpatentable
35 U.S.C. § 318(a)

I. INTRODUCTION

A. Background and Summary

Apple Inc. ("Petitioner") requests *inter partes* review of claims 1-10, 12-30, and 46-53 (the "challenged claims") of U.S. Patent No. 8,768,865 B2 (Ex. 1001, "the '865 patent") pursuant to 35 U.S.C. §§ 311 *et seq*. Paper 2 ("Petition" or "Pet."). Qualcomm Incorporated ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). Based on the record before us at that time, we instituted an *inter partes* review of all challenged claims and all grounds. Paper 7 ("Decision on Institution" or "Dec. on Inst.").

Patent Owner filed a Patent Owner's Response (Paper 18, "PO Resp."), Petitioner filed a Reply (Paper 22, "Reply"), and Patent Owner filed a Sur-reply (Paper 25, "Sur-reply").

We heard oral argument on October 30, 2019 and a transcript of that hearing is in the record. Paper 33.

Upon consideration of the complete record, we determine that Petitioner has proven, by a preponderance of the evidence, that claims 1-3, 6-10, 12-22, 25-30, 46, 47, and 49-53 are unpatentable. However, Petitioner has failed to show, by a preponderance of the evidence, that claims 4, 5, 23, 24, and 48 are unpatentable.

B. Real Parties-In-Interest and Related Matters

Apple Inc. is identified as the sole real party-in-interest. Pet. 69. The parties inform us that the '865 patent was asserted against Petitioner in the litigation *Qualcomm Inc. v. Apple Inc.*, No. 3:17-cv-02402 (S.D. Cal.). Pet. 69; Paper 4, 1. Petitioner further informs us that the above-identified litigation has been dismissed. Paper 17. Patent Owner further inform us that the '865

patent is at issue in *inter partes* review Case IPR2018-01281. Paper 4, 1.

C. The '865 Patent

The '865 patent is generally directed to "machine learning of situations via pattern matching or recognition for use in or with mobile communication devices." Ex. 1001, 1:21-23. According to the '865 patent, mobile communication devices (e.g., cellular and smart phones) may feature a number of sensors (built-in or otherwise supported) such as "accelerometers, gyroscopes, magnetometers, gravitometers, ambient light detectors, proximity sensors, thermometers, location sensors, microphones, cameras, etc." *Id.* at 1:34-37. The '865 patent states that a popular feature of such mobile devices is using such sensors to better understand what a user is presently doing so as to better assist the user in his/her present activity. *Id.* at 1:42-47. However, according to the '865 patent, the growing number of sensors generates a high volume of data to be captured and analyzed and, thus, creates challenges to efficiently and effectively capture and process such voluminous data. *Id.* at 1:47-60.

Specifically, the '865 patent identifies challenges for such mobile devices as follows:

> These challenges may include, for example, detecting or "picking up" patterns from a large number of information sources with an unknown or different subset of sources being relevant to different situations or contexts. In other words, in some instances, it may be somewhat difficult to detect or recognize an existing pattern if such a pattern is not predefined or pre-specified in some manner for a certain information source. Another challenge

> with typical approaches may be, for example, identifying one or more relevant situations and learning patterns that are correlated with or correspond to these relevant situations. Consider, for example, a multi-dimensional information stream captured or obtained via a variety of sensors with respect to a typical "return-home-after-work" experience of a user.

Id. at 7:8-21. The '865 patent further identifies challenges of the prior art as follows:

> As seen, because of an increased dimensionality of an information stream due, at least in part, to a large variation of sensor–tracked parameters indicative of user–related events or conditions (e.g., walking, driving, fidgeting, etc.), finding exact or approximate matches to a template, pre-defined or otherwise, may be rather difficult. In other words, at times, a relatively large number of varying parameters or variables associated with a multi-dimensional sensor information stream may be difficult to track, correlate, process, associate, etc., which in turn may limit the ability of a mobile device to react to different situations, make relevant inferences, or otherwise be aware of its context with sufficient accuracy. In addition, certain varying parameters or variables may be irrelevant to a particular user situation or context, in which case it may be important or otherwise useful to identify irrelevant or incidental variables so as to ignore or omit one or more corresponding irrelevant patterns from consideration, as described below.

Id. at 7:40-57.

The '865 patent purports to address these challenges by monitoring "one or more conditions or events of interest," rather than continuously monitoring all or most of the available sensor information. *Id.* at 7:64-8:1. In particular, according to the '865 patent, a subset of parameters associated with a condition or event of interest may be "fixed in some manner and stored in a suitable database." *Id.* at 8:12-15. The parameter values associated with the condition or event may be fixed, for example, "by associating corresponding parameters or variables having a particular, distinct, or otherwise suitable pattern to represent the condition or event." *Id.* at 8:19-21. "A suitable processor may then look or search for a pattern match, exact or approximate, in one or more other signal–related patterns every time a condition or event–related pattern occurs, for example, by utilizing a 'snapshot,' in whole or in part, using any suitable pattern matching processes or algorithms." *Id.* at 8:25-31.

Figure 4 of the '865 patent is reproduced below.

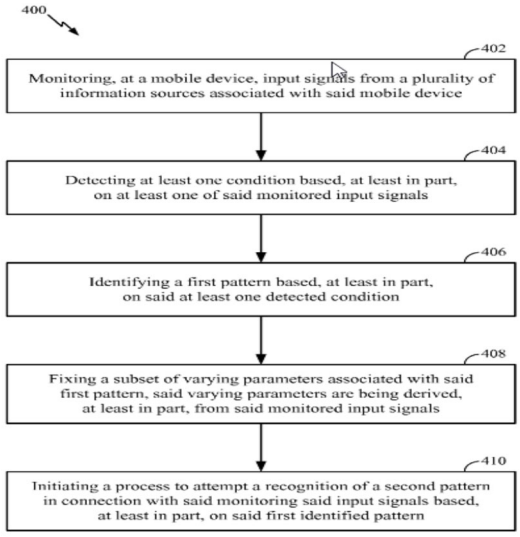

FIG. 4

Figure 4 is a flowchart of exemplary process 400 for machine learning of situations in a mobile device using pattern matching or recognition. *Id.* at 2:8-11. Step 402 monitors input signals from a plurality of sources (sensors) associated with the mobile device. *Id.* at 14:43-46. Step 404 detects at least one condition or event of interest based on at least one of the monitored input sources. *Id.* at 14:54-57. At step 406, a "first pattern may be identified based, at least in part, on at least one detected condition or event," e.g., "a distinct signal–related pattern having one or more varying parameters or variables of interest that may be representative of or otherwise correspond to such a condition or event." *Id.* at 14:67-15:5. Step 408 then fixes one or more parameters by storing them in a database or by associating the parameters with a pattern to represent a condition or event. *Id.* at 15:5-17. Step 410 then attempts to recognize a second pattern based on the first pattern. *Id.* at 15:18-21.

D. Illustrative Claim

Independent method claim 1, reproduced below, is illustrative of the challenged claims:

> 1. A method comprising:
>
> monitoring, at a mobile device, input signals from a plurality of information sources associated with said mobile device;
>
> detecting at least one condition based, at least in part, on at least one of said monitored input signals;
>
> identifying a first pattern based, at least in part, on said at least one detected condition; and
>
> fixing a subset of varying parameters associated with said first pattern by associating at least one

> parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition, said varying parameters derived, at least in part, from said monitored input signals.

Id. at 20:62-21:8. Challenged independent claim 21 recites similar limitations in the style of an apparatus claim (*id.* at 22:24-39), and challenged independent claim 46 recites similar limitations in the style of an article of manufacture claim (a non-transitory storage medium storing programmed instructions) (*id.* at 24:20-35).

E. Prior Art and Asserted Grounds

Petitioner asserts the challenged claims are unpatentable based on the following grounds (Pet. 5-6):

Claims Challenged	35 U.S.C. §	Reference(s)/Basis
1-4, 15-17, 21-23, 28, 29, 46, 47	102(e)[1]	Louch[2]
5-10, 18-20, 24-27, 30, 48-53	103(a)	Louch, Nadkarni[3]
12-14	103(a)	Louch, Nadkarni, Greenhill[4]

[1] The Leahy-Smith America Invents Act ("AIA") amended 35 U.S.C. §§ 102 and 103. *See* Pub. L. No. 112-29, 125 Stat. 284, 287-88 (2011). Because the application that resulted in the '865 patent was filed before the effective date of the post-AIA amendment (March 16, 2013), the pre-AIA versions of §§ 102 and 103 apply.

[2] US 8,676,224 B2, filed Feb. 19, 2008, issued Mar. 18, 2014 ("Louch," Ex. 1011).

[3] US 2010/0217533 A1, issued Aug. 26, 2010 ("Nadkarni," Ex. 1008).

Petitioner also relies on the declaration of James F. Allen, Ph.D. (Ex. 1021) in support of its assertions. Patent Owner relies on the declaration of John Villasenor, Ph.D. (Ex. 2005) in support of its assertions.

II. ANALYSIS

A. Legal Standards

1. Anticipation

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008); *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Each element of the challenged claim must be found, either expressly or inherently, in the single prior art reference. *Verdegaal Bros., Inc. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Although the elements must be arranged or combined in the same way as in the claim, "the reference need not satisfy an *ipsissimis verbis* test," i.e., identity of terminology is not required. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009); *In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Thus, the dispositive question is whether one ordinarily skilled in the art would reasonably understand or infer from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074-75 (Fed. Cir. 2017). Still further, "it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw

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[4] US 2008/0297513 A1, issued Dec. 4, 2008 ("Greenhill," Ex. 1009).

therefrom." *In re Preda*, 401 F.2d 825, 826 (CCPA 1968).

2. Obviousness

A patent claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed subject matter and the prior art are "such that the subject matter[,] as a whole[,] would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved based on 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 skill in the art; and (4) objective evidence of non-obviousness, i.e., secondary considerations.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

B. Level of Ordinary Skill in the Art

The Petition does not specifically define the level of skill for a person of ordinary skill in the art. Dr. Allen's expert declaration in support of the Petition argues a person of ordinary skill in the art at the time of the '865 patent "would have had a Bachelor of Science degree in either computer science or electrical engineering, together with at least two years of study in an advanced degree program in artificial intelligence, machine learning, or pattern recognition, or comparable work experience." Ex. 1021 ¶ 10.

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[5] Patent Owner does not present arguments or evidence of such secondary considerations in its briefs. Therefore, secondary considerations do not enter into our analysis.

Patent Owner argues a person of ordinary skill in the art at the time of the '865 patent "would have had a Bachelor's of science degree in electrical engineering, computer science, computer engineering, or a closely–related field, and at least 2 years of work or research experience in the field of machine learning or a closely related field." PO Resp. 35 (citing Ex. 2005 ¶ 45). Patent Owner contends any differences between its definition of the level of ordinary skill and that of Dr. Allen "are not material to the issues to be decided." *Id.* (citing Ex. 2005 ¶ 47).

We discern no significant distinction between Dr. Allen's definition of the level of ordinary skill and that of Patent Owner. In view of Patent Owner's admission that any differences are not material to the issues we decide here, we discern no reason to depart from our definition of the level of ordinary skill as determined in our Decision on Institution. Dec. on Inst. 10.

Accordingly, we adopt Dr. Allen's definition of the level of ordinary skill in the art and determine that a person of ordinary skill in the art at the time of the invention of the '865 patent would have had a Bachelor of Science degree in either computer science or electrical engineering, together with at least two years of study in an advanced degree program in artificial intelligence, machine learning, or pattern recognition, or comparable work experience.

C. Claim Construction

This proceeding was filed on June 29, 2018. In an *inter partes* review for a petition filed before Novem-

ber 13, 2018,[6] a claim in an unexpired patent that will not expire before the issuance of a final written decision shall be given its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b) (2017); *see also Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142-46 (2016) (upholding the use of the broadest reasonable interpretation standard ("BRI standard")); *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769 (Fed. Cir. 2018) ("In IPR, the Board gives claims their broadest reasonable interpretation consistent with the specification."). Under the broadest reasonable interpretation standard, claim terms generally are given their ordinary and customary meaning, as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). "[A] claim construction analysis must begin and remain centered on the claim language itself … ." *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1116 (Fed. Cir. 2004). "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 1011, 1014 (Fed. Cir. 2006) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-17 (Fed. Cir. 2005) (en banc)). "Though understanding the claim language may be aided by the explanations contained in the written description, it is im-

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[6] *Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board*, 83 Fed. Reg. 51,340, 51,340 (Oct, 11, 2018) (to be codified at 37 C.F.R. § 42)

portant not to import into a claim limitations that are not a part of the claim." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

By contrast, for a patent that has expired or will likely expire before this Final Written Decision is entered, or for an unexpired patent challenged in a petition filed on or after November 13, 2018, we apply the principles set forth in *Phillips*, 415 F.3d at 1312-17 (the "*Phillips* standard"). *See Wasica Fin. GmbH v. Cont'l Auto. Sys., Inc.*, 853 F.3d 1272, 1279 (Fed. Cir. 2017); *see also* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,340 (Oct, 11, 2018) (to be codified at 37 C.F.R. § 42).

Petitioner does not indicate whether it is applying the BRI standard or the *Phillips* standard but, instead, asserts "Petitioner gives all terms their plain meaning." Pet. 11. Patent Owner describes the BRI standard but does not clearly state that it is applying that standard for any proffered claim constructions. PO Resp. 17.

On the record before us, we discern that the '865 patent is not expired, the patent will not likely expire prior to entry of this Final Written Decision, neither party has made a request in compliance with our rules that the *Phillips* standard be applied,[7] and the Petition was filed prior to the change of our rules regarding claim construction effective for petitions filed on or after November 13, 2018. Therefore, we apply the

[7] The applicable version of 37 C.F.R. § 42.100(b) requires that a request to apply the *Phillips* standard "must be made in the form of a motion under § 42.20, within 30 days from the filing of the petition."

broadest reasonable interpretation (BRI standard) for any needed claim construction.

Petitioner proffers a construction of numerous claim terms including the terms *pattern* and *fixing* as recited in the claims. Pet. 11-15. Patent Owner disputes Petitioner's construction of these two terms. PO Resp. 17-25. Patent Owner also provides a section of its Response entitled "Terminology" in which Patent Owner discusses three terms ("variables," "patterns," and "conditions") but, apparently, does not proffer these discussions as express claim constructions of those terms. *Id.* at 6-8.

Other than the terms discussed below, we discern no reason to expressly construe any other claim terms. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) ("[W]e need only construe terms 'that are in controversy, and only to the extent necessary to resolve the controversy.'" (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

1. "Condition"

Claim 1 recites "identifying a first pattern based, at least in part, on said at least one detected condition." Petitioner relies on disclosures of the '865 patent to interpret the term "condition," and argues,

> The '865 Patent expressly discloses that "a **condition** or event of interest may include, for example, a time of day, day of week, state or action of a host application, action of a user operating a mobile device (e.g., silencing a ringer, muting a call, sending a text message, etc.) or the like," and further discloses that "**user–related events or conditions**" **may include**

> "**walking**, driving, fidgeting, etc." [Ex. 1001, 7:40-45, 14:60-64]. Accordingly, the term "condition" is broad enough to encompass at least the above-listed items.

Pet. 11-12 (citing Ex. 1021 ¶¶ 50-51). Thus, Petitioner does not proffer an express construction of "condition" but, instead, contends "condition" is at least broad enough to encompass the above-identified examples (i.e., including, for example, walking and driving).

Patent Owner identifies examples of conditions as including "a time of day," "action of a user operating a mobile device," "walking," and "driving." PO Resp. 8 (citing Ex. 1001, 7:42-43, 8:1-6, 8:54-60). We note that Patent Owner discusses these exemplary "conditions" in a section of the Response entitled "Terminology," a section separate from a section entitled "Claim Construction." *See* PO Resp. 6, 17. Thus, like Petitioner, Patent Owner does not proffer an express construction of "condition" but, instead provides examples of disclosed "condition[s]."

Both parties identify portions of the '865 patent Specification that disclose exemplary conditions: "sensor–tracked parameters indicative of user–related events or conditions (e.g., walking, driving, fidgeting, etc.)." Ex. 1001, 7:42-43. Furthermore, "[b]y way of example but not limitation, a condition or event may include, for example, a time of day, day of week, state or action of a host application, action of a user operating a mobile device (e.g., silencing a ringer, muting a call, sending a text message, etc.) or the like, just to name a few examples." *Id.* at 8:1-6.

These exemplary conditions, though not defining or limiting the full scope of the term "condition," at least define some examples that are encompassed by the

term. Although we discern no need for an express construction of the full scope of the term "condition" as used in the claims, we determine that "condition" is at least broad enough to encompass each of the exemplary above-identified examples disclosed in the '865 patent—including, for example, "time of day" and "action of a user operating a mobile device (e.g., silencing a ringer, muting a call, sending a text message, etc.)."

2. "Pattern"

Claim 1 includes the recitation "identifying a first pattern based, at least in part, on said at least one detected condition." Claims 21 and 46 and their respective dependent claims include similar limitations referring to a "second pattern."

Petitioner argues "[t]he term 'pattern' is broad enough to encompass a 'collection of one or more parameter values.'" Pet. 12-13 (citing Ex. 1001, 6:49-55, 9:63-67, 10:34-44, Fig. 3; Ex. 1021 ¶¶ 52-58).

Patent Owner argues the "***complete*** BRI of 'pattern' [is] 'a collection of one or more pairs of varying parameters and corresponding parameter values, as well as the relationship between each pair (where the relationship may be implicit).'" PO Resp. 17-19 (citing Ex. 2003, 28:9-15, 31:14-32:17, 56:20-23, 58:9-15; Ex. 2005 ¶¶ 37-40; Ex. 1001, Fig. 3 (as annotated by Petitioner at Pet. 12)).

Petitioner argues Patent Owner's interpretation is incorrect because requiring a "pattern" to include relationships between two or more parameters excludes embodiments detecting patterns that rely on the value of only a single parameter. Reply 3-5 (citing Ex. 1026, 14:10-15:5, 25:20-26:5, 49:10-15; Ex. 1023 ¶ 114).

Petitioner explains,

> Despite previously agreeing with Petitioner as to this term's meaning (*see* Ex.1024, p32 (p16 of Ex.A thereto); Ex.1026, 25:20-26:5; Ex.1023, ¶114), Qualcomm now insists this term requires a convoluted three-part construction: "a collection of one or more pairs of [(1)] varying parameters and [(2)] corresponding parameter values, as well as [(3)] the relationship between each pair (where the relationship may be implicit)."

Id. at 3 (alterations in original).

First, we determine that the portion of Patent Owner's proffered interpretation that speaks to a parameter and its corresponding value as a "pair" is not inconsistent with Petitioner's reference to a "parameter value." In other words, we discern no meaningful difference between a "pair" that consists of a parameter and its corresponding value, as used in Patent Owner's proffered interpretation, and a "parameter value," as used in Petitioner's proffered interpretation.

Second, we agree with Petitioner that Patent Owner's proffered interpretation, requiring a "pattern" to include relationships *between two or more such pairs*, incorrectly excludes embodiments where a "pattern" may be identified by the value of only a single parameter. We find nothing in the intrinsic evidence that supports Patent Owner's narrow interpretation. By contrast, Petitioner identifies support in the '865 patent Specification referring to a "pattern" being represented by "*one or more*" values of parameters in support of its interpretation that encompasses a single parameter value representing a "pattern." *See* Pet. 12 (citing Ex. 1001, 6:49-55, 9:63-67). Furthermore, Petitioner points to deposition testimony of Patent Owner's ex-

pert (Dr. Villasenor) as extrinsic evidence to support the contention that a "pattern" encompasses the value of even a single parameter.

> [Q.] … So in your opinion, a pattern could include only a single pair of parameter and its corresponding parameter value; is that correct?
>
> A. Correct.
>
> Q. So, for example, using the example in paragraph 38 of your declaration, a pattern could be location X?
>
> A. Correct.
>
> Q. And if that's the pattern, is there a relationship present?
>
> A. Well, the relationship that the X is the value corresponding to the parameter or the variable location.
>
> Q. Okay. But it doesn't include a relationship between another pair of parameter and parameter values because there isn't another pair?
>
> A. Well, yeah, if there's only one pair, then there can't be a relationship with another pair within that pattern.

Ex. 1026, 14:10-15:5 (cited at Reply 5). Petitioner points to additional testimony from Dr. Villasenor.

> Q. Sure. And in this example, the second pattern is "Motion State" equals "Driving" and WiFi SSID changing from SSID_3 to SSID_1?
>
> A. Well, I would — I would say that the first pattern is "Motion State" is equal to "Driving."

Id. at 49:10-15. Patent Owner apparently now disavows that testimony by its expert. Moreover, as noted by Petitioner, even Patent Owner's narrower interpretation encompasses one or more such pairs. Reply 3 ("Qualcomm now insists this term requires a convoluted three-part construction: 'a collection of ***one or more pairs*** of [(1)] varying parameters and [(2)] corresponding parameter values, as well as [(3)] the relationship between each pair (where the relationship may be implicit).'" (emphasis added)). Accordingly, a "pattern" encompasses a single parameter and its value such that there is *no* required relationship with another parameter.

Based on the complete record developed through trial, we determine that the broadest reasonable interpretation of "pattern" encompasses, at least, Petitioner's proffered interpretation that a "pattern" is "*a collection of one or more parameter values*."

3. "Fixing … by Associating"

Challenged independent method claim 1 recites a step of "fixing a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Similarly, challenged independent apparatus claim 21 recites a mobile device with a processor configured to "fix a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Like claim 21, challenged independent claim 46 recites an article (a non-transitory storage medium) storing instructions causing a processor of a mobile device to "fix a subset of varying parameters associated

with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." We refer to these limitations collectively as the "fixing limitations."

Petitioner argues the fixing limitations encompass "associating at least one parameter of a subset of varying parameters with the first pattern to represent at least one detected condition" and contends that claim 1 of the '865 patent, the Specification of the '865 patent, and Dr. Allen's Declaration all support this interpretation. Pet. 13-14 (citing Ex. 1001, 15:9-12, 21:3-6 (claim 1); Ex. 1021 ¶¶ 59-63). Furthermore, in support of its interpretation of "fixing," Petitioner quotes a portion of the prosecution history of the '865 patent wherein Patent Owner remarked, in response to an Examiner rejection,

> Claims 1, 22, 32, and 48 have been amended to incorporate aspects of former claims 2 and 33, to clarify that "fixing a subset of carrying parameters" is done "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition."

Pet. 14 (quoting Ex. 1002, 40).

In Patent Owner's Preliminary Response, Patent Owner argued Petitioner's proffered interpretation is unreasonable in that it eliminates the recitation of "fixing" and reduces the element to the action of "associating" regardless of whether the associating results in fixing. Prelim. Resp. 16-21. Specifically, Patent Owner argued in its Preliminary Response that the fixing element "is not met if 'associating' is performed in a context that does not result in 'fixing.'" *Id.* at 16. Patent

Owner contended in the Preliminary Response that, under the proper interpretation of the fixing limitations, "'by' introduces a necessary sub-step that must be performed when 'fixing.'" *Id.* at 18. Still further, Patent Owner argued the cited portion of the prosecution history (Exhibit 1002, 40) does not support Petitioner's interpretation but, instead, asserts, "[n]othing in that passage suggests that 'associating …' performed in a context that does not accomplish 'fixing …' would be sufficient to meet the claims." *Id.* at 20-21.

Our Decision on Institution determined:

> On the record before us for purposes of this preliminary decision, we are persuaded by Petitioner's proffered construction of the *fixing* limitations. Specifically, the plain language of challenged independent claims 1, 21, and 46 sufficiently defines the scope of *fixing* as limited to *fixing* ***by*** the action of *associating*. Other actions that may result in the recited *fixing* are not within the scope of challenged claims 1, 21, and 46, which clearly recite that *fixing* is accomplished by a specific recited action, namely by *associating*.

Dec. on Inst. 15. Accordingly, in our Decision on Institution, we adopted Petitioner's interpretation determining, "the fixing limitations of claims 1, 21, and 46 at least encompass associating at least one parameter of a subset of varying parameters with the first pattern to represent at least one detected condition." *Id.* at 17.

Patent Owner disputes our preliminary interpretation for a number of reasons. We do not agree with Patent Owner's arguments, as discussed below.

a) "Fixing" as "Setting the Scope of Analysis" is Unsupported

In Patent Owner's Response, Patent Owner argues,

> The BRI of "fixing … by associating …" is: "***setting the scope of pattern recognition analysis to where a subset of varying parameters match parameter values associated with said first pattern*** by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition."

PO Resp. 19 (citing Ex. 2005 ¶¶ 27-36, 41-44). Patent Owner further argues, "[t]his construction largely repeats the plain language of the claim and further clarifies that 'fixing' means setting the scope of analysis for pattern recognition." *Id.* Patent Owner points to the use of "fixing" in the '865 patent Specification, where (in the provisional patent application incorporated by reference and to which the '865 patent claims priority) it discloses "[f]ix one subset of variables and identify patterns in a second subset of variable when there is a pattern in the fixed subset of variable." *Id.* (citing Ex. 2001, 15; Ex. 1001, 13:23-26, 13:36-37; Ex. 2005 ¶¶ 27-36). Patent Owner further argues that Petitioner and our Decision on Institution "rely on specification statements such as '[i]n some instances, a subset may be fixed, for example, by associating,'" but contends its proffered interpretation is similarly consistent with that disclosure as well as "all other uses of 'fixing' in the specification," whereas "Petitioner's construction fails to require the result of 'fixing' consistently described by the specification." *Id.* at 20 (citing Pet. 13 (relying

on Ex. 1001, 15:9-12) (alteration in original); Ex. 2004 ¶ 43).

Petitioner replies that Patent Owner's proffered interpretation improperly imports a limitation of dependent claim 3 into the fixing limitation of claim 1 because Patent Owner's assertion that fixing "sets the scope" of analysis for pattern recognition is not an aspect of claim 1 but, instead, arises in claim 3's limitations relating to recognizing a second pattern. Reply 7-8. Petitioner further argues Patent Owner's proffered interpretation of "fixing" finds no support in the '865 patent Specification or in the provisional patent application from which the '865 patent claims priority. Reply 8-11. Specifically, regarding the Specification and the provisional patent application, Petitioner contends "the passages nowhere suggest recognizing a second pattern or setting its scope is required to practice the independent claims." Reply 8.

Patent Owner responds,

> The correctness of [Patent Owner's] construction—and incorrectness of Petitioner's—can be seen by substituting both into the specification passages that describe what "fixing" enables. For example, the '865 Patent states that the act of "fixing one variable associated with or corresponding to 'driving'" results in "an application processor associated with a mobile device" being able to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'"
>
> Substituting in [Patent Owner's] construction, it remains a true statement that "**setting the scope of analysis to where motion state is equal to driving**" enables an application pro-

> cessor to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'" In contrast, merely "**associating the varying parameter motion state with the parameter value driving**" would not enable an application processor to "observe what other variables have patterns if a motion state corresponds, for example, to 'driving.'"

Sur-reply 8 (citations omitted). Patent Owner contends "merely performing the 'associating' without using the 'associating' to set the scope of analysis would not assist subsequent pattern recognition." *Id.* at 8.

We are not persuaded to adopt Patent Owner's proffered interpretation. First, we find nothing in the Specification, including the provisional patent application, that discusses "setting the scope," or even the word "scope" in reference to recognition of a first or second pattern. As noted *supra*, Patent Owner points to the '865 patent Specification and the provisional patent application as supporting its proffered interpretation that "fixing" sets the scope of analysis for later pattern recognition. *See* PO Resp. 19 (citing Ex. 1001, 13:23-26, 13:36-37; Ex. 2001, 15); *see also id.* at 9-10 (citing Ex. 1001, 13:19-22; Ex. 2001, 15). We discern no support for Patent Owner's interpretation in these citations. The cited portions of the '865 patent disclose,

> At least *one subset of variables of interest may be fixed, as discussed above, and one or more patterns in a second subset of variables may be identified, for example, if there is a pattern in the fixed subset of variables.* By way of example but not limitation, an application processor associated with a mobile device may observe what other variables have patterns if a motion

> state corresponds, for example, to "driving," as one possible illustration.
>
> …
>
> For example, fixing one variable associated with or corresponding to "driving" may not be helpful in meaningful pattern identification.

Ex. 1001, 13:19-26, 36-38 (emphasis added). First, the highlighted disclosure merely teaches that patterns (i.e., a "second pattern") may be identified in a second subset of variables *if there is a pattern in the fixed subset of variables*. At best, this indicates that a second pattern may be identified *conditioned on* there being a pattern in the fixed variables. Such a conditional predicate does not expressly or impliedly support that *fixing* means setting the scope of analysis for pattern recognition as in Patent Owner's proffered interpretation. Second, the cited portion reads: "fixed, *as discussed above*," referring to earlier discussions of how a subset of variables may be "fixed." We discern only one earlier discussion in the '865 patent that discloses *how* variables are fixed—specifically disclosing "a condition or event–related pattern may be fixed, for example, by associating corresponding parameters or variable having a particular, distinct, or otherwise suitable pattern to represent the condition or event." Ex. 1001, 8:18-21. Thus, the only earlier, express, disclosure of how variables are "fixed" supports Petitioner's broader interpretation that the fixing limitations are met by "associating" as recited in the claims.

In like manner, the cited portion of the provisional patent application discloses:

- A solution to making this feasible is as follows:
    - Monitor variables individually for patterns

- *Fix one subset of variables and identity patterns in a second subset of variables when there is a pattern in the fixed subset of variables*
    - *E.g., observe what other variables have patterns when motion state corresponds to "driving"*
    - *For real world situations, a fixed subset of 1 variable might be insufficient (e.g., just fixing "driving" will likely not identify meaningful patterns)*
    - The cardinality of the subsets are hence experimental parameters (similar to the value of "k" in a k-Nearest Neighbor classification algorithm)

Ex. 2001, 15 (emphasis added). The preceding page of the exhibit discusses the problem that "[i]dentifying relevant subsets of variables corresponding to various situations is computationally expensive," and the cited portion of page 15 identifies a possible solution to this problem. *Id.* at 14-15. However, the above-emphasized disclosure merely teaches that patterns are identified in a second subset of variables *when there is a pattern in the fixed subset of variables*. Thus, like the cited portions of the '865 patent Specification, this disclosure merely recites a condition precedent to the identification of a second pattern—the condition that there is a pattern in the first subset of variables. Again, we discern no support for Patent Owner's assertion that *fixing* means setting the scope of analysis.

Moreover, we agree with Petitioner that nothing in independent claim 1 (or independent claims 21 and 46) requires any identification of a second pattern by *fix-*

ing, or by any other technique. Reply 7-8. The recognition of a second pattern is first recited in claim 3, dependent from claim 1 (as well as claim 22 dependent from claim 21, and claim 47 dependent from claim 46). Furthermore, even the reference to the second pattern in claim 3 (as well as claims 22 and 47) does not rely on the fixing limitations of the base claim but, instead, merely requires that "recognition of a second pattern … [is] based, at least in part, on said first identified pattern." Ex. 1001, 21:18-20. Even claim 4, dependent from claim 3, merely requires that the "second pattern is recognized in a reduced set of varying parameters derived from said monitored input signals in response, at least in part, to said fixing of said subset of varying parameters." *Id.* at 21:21-24. In other words, consistent with the '865 patent Specification, claim 4 merely recites a condition precedent to the recognition of a second pattern—the condition being the fixing of a subset of varying parameters. Although "fixing" is a condition precedent to subsequent pattern recognition, the claim does not require that the second pattern is recognized by the act of *fixing* (e.g., by an action of setting the scope of analysis), but only requires that that the recognition of the second pattern is in response to *fixing* (e.g., chronologically subsequent to *fixing*).

Accordingly, we discern no requirement in the '865 patent claims, Specification, or prosecution history that support Patent Owner's narrower, proffered interpretation requiring the fixing limitations to set the scope of analysis for further pattern recognition.

By contrast, the language of claim 1 (as well as claims 21 and 46) provides clear support for Petitioner's broader, proffered interpretation of fixing because the claim was amended to specify that *fixing* is "*by associating* …"—i.e., the fixing limitations are met *by associ-*

ating. The '865 patent Specification further supports Petitioner's broader, proffered interpretation that *fixing* is done *by associating* parameters with a condition. Ex. 1001, 8:18-21 ("Such a condition or event–related pattern *may be fixed*, for example, *by associating* corresponding parameters or variables having a particular, distinct, or otherwise suitable pattern to represent the condition or event." (emphasis added)); *see also id.* at 15:9-12. The prosecution history also makes clear that *fixing* means *associating* parameters with a pattern. Ex. 1002, 40 ("Claims 1, 22, 32, and 48 have been amended to incorporate aspects of former claims 2 and 33, to clarify that '*fixing* a subset of carrying parameters' *is done 'by associating* at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition.'").

We acknowledge the '865 patent discloses a potential benefit in performing the fixing limitations as improving efficiency of pattern matching. *See* Ex. 1001, 10:29-33 ("As discussed above, identifying a repetitive pattern within a smaller number of variables due, at least in part, to fixing at least one subset of variables of a multi-dimensional information stream, for example, may, therefore, prove beneficial."); *see also id.* at 15:13-17. The '865 patent further discloses complexity problems with using sensors in mobile communication devices:

> These challenges may include, for example, multi-sensor parameter tracking, multi-modal information stream integration, increased signal pattern classification or recognition complexity, background processing bandwidth requirements, or the like, which may be at least partially attributed to a more dynamic envi-

> ronment created by user mobility. Accordingly, how to capture, integrate, or otherwise process multi-dimensional sensor information in an effective or efficient manner for a more satisfying user experience continues to be an area of development.

Id. at 1:51-60. However, the benefit or purpose of performing the fixing limitations cannot override the clear definition of how *fixing* is performed as expressly taught in the claims and the Specification, namely, that *fixing* is done *by associating*.

b) Our Construction Does Not Remove "Fixing" as a Limitation

Patent Owner argues Petitioner's interpretation fails to give meaning to all words of the claim by effectively removing the term *fixing* from the claims. PO Resp. 21-25. Specifically, Patent Owner argues Petitioner's interpretation of *fixing* identifies *associating* as "a specific way to accomplish 'fixing'" but Patent Owner's interpretation identifies *associating* as merely "a specific way of performing a ***substep*** of 'fixing.'" *Id.* at 21. Patent Owner argues that "the 'substep' interpretation is the only defensible interpretation as the claim would be understood by one of ordinary skill in the art ***in the context of the entire disclosure***." *Id.* at 22 (citing Translogic, 504 F.3d at 1257). Patent Owner argues Petitioner's expert (Dr. Allen) agrees that associating is a substep of *fixing* and also a substep of context labeling and, thus, *fixing* is not synonymous with *associating*. *Id.* Patent Owner further argues,

> Petitioner's interpretation is contrary to the specification because merely "associating" does not achieve what the specification repeatedly and consistently describes "fixing" parameters

> of the first pattern as having a particular result … the specification repeatedly and consistently describes "fixing" parameters of the first pattern as enabling the system to identify other patterns that are present when there is a pattern in the fixed variables of the first pattern.

Id. at 22-23 (citing Ex. 2005 ¶¶ 27-30, 32, 43).

We are unpersuaded by Patent Owner's argument. Petitioner's interpretation of *fixing* does not remove the term "fixing" from the claims but, instead, limits the broadest reasonable interpretation to *fixing* "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition" as clearly required by the claims and as consistent with the Specification of the '865 patent.

Furthermore, we find no support in the '865 patent Specification for Patent Owner's contention that "the specification repeatedly and consistently describes 'fixing' parameters of the first pattern as *enabling* the system to identify other patterns that are present when there is a pattern in the fixed variables of the first pattern." PO Resp. 22-23 (emphasis added). Searching the '865 patent Specification as well as the provisional patent application, we find no phrase in which the results of fixing or the act of fixing in some manner *enables* the identification of other patterns. Instead, as discussed *supra*, the disclosures of fixing relate to performing the step of fixing as a condition precedent to the identification of other patterns—i.e., a step, done by associating, to be performed prior to steps to identify other patterns, as in claim 3. However, we are not persuaded that the step of fixing is disclosed as a function whose results are required to identify other patterns (i.e., to

set the scope of analysis for recognizing other patterns).

c) Fixing Is Not The Same As Identifying

Patent Owner contends Petitioner's proffered interpretation of fixing "broadens 'fixing …' such that it becomes duplicative of, and is rendered superfluous by, the separately-recited 'identifying' step." PO Resp. 23. Patent Owner argues Petitioner's expert (Dr. Allen) "was unable to identify a meaningful distinction" between the identifying step and Petitioner's interpretation of the fixing limitations. *Id.* at 23-24 (citing Ex. 2003,[8] 56:21-57:6).

We do not agree with Patent Owner's argument. First, neither party proffers an interpretation of the term *identifying* and we discern no reason to interpret the term expressly. In particular, we discern no reason to interpret *identifying* to be the same as our interpretation of *fixing*—namely, "associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition." Thus, we are not persuaded that Petitioner's interpretation renders *fixing* superfluous as identical to the identifying step.

Second, we acknowledge some confusion in Dr. Allen's deposition testimony responsive to questions regarding distinctions between the identifying steps and the fixing limitations. *See* PO Resp. 22-23 (citing Ex. 2003, 56:21-57:6); *see also* Ex. 2003, 55-59. However, our interpretation of *fixing* is supported by

[8] Patent Owner's citation refers to "*Id.*," but the prior citation is to Exhibit 1001 when clearly Patent Owner intended to cite to Dr. Allen's deposition testimony in Exhibit 2003. We find the error harmless.

the intrinsic evidence and, most importantly, by the claim language per se. The claims clearly recite that *fixing* is "by associating … ." Given such strong support for our interpretation in the claims and similarly strong support in the remaining intrinsic evidence as discussed *supra*, we need not consider conflicting or confusing extrinsic evidence. *See Phillips*, 415 F.3d at 1318 ("Similarly, a court should discount any expert testimony 'that is clearly at odds with the claim construction mandated by the claims themselves, the written description, and the prosecution history, in other words, with the written record of the patent.'" (quoting *Key Pharms. v. Hercon Labs. Corp.*, 161 F.3d 709, 716 (Fed. Cir. 1998))).

d) Conclusion Regarding Interpretation of "Fixing"

For the above reasons, having considered the parties' arguments and supporting evidence, we determine that it is not necessary to construe the full breadth of the meaning of *fixing*, however, we agree with Petitioner that the broadest reasonable interpretation of *fixing* is at least broad enough to include "by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition" as recited in claim 1 and as similarly recited in claims 21 and 46.

D. Anticipation by Louch

Petitioner argues claims 1-4, 15-17, 21-23, 28, 29, 46, and 47 are anticipated by Louch.

1. Overview of Louch (Ex. 1011)

Louch is directed to control of a speakerphone system of a mobile device. *See* Ex. 1011, code (54), code (57). "A speakerphone system integrated in a mobile device is automatically controlled based on the current

state of the mobile device. In one implementation, the mobile device is controlled based on an orientation or position of the mobile device." *Id.* at code (57). According to Louch, a typical speakerphone feature in a mobile device is controlled by hardware and/or software of the device that require the user to physically contact the phone to enable or disable the speakerphone function of the device. *Id.* at 1:22-25. When attempting to use the mobile device in a hands-free mode, the user needs to manually activate and deactivate the speakerphone function by physically contacting some feature on the phone to control the device. *Id.* at 1:25-31.

Louch discloses an improved mobile device in which the device is automatically controlled based on an orientation or position of the mobile device. *Id.* at 1:35-42. The position or orientation state of the device may be determined relative to a reference frame using one or more sensors such as an accelerometer, gyroscope, light sensor, proximity sensor, etc. *Id.* at 2:17-24. The mobile device may utilize a state machine to maintain the current state of the device. *Id.* at 2:52-54. The state machine may detect changes of state based on combinations of input signals and can cause a control action to be performed based on a detected state change. *Id.* at 2:54-58. "A control action can be activating or deactivating the speakerphone system, generating or adjusting a graphical user interface and/or any other suitable control action." *Id.* at 2:58-61.

2. Analysis of Claims 1, 21, and 46

Claim 1 is an independent method claim. Claims 21 and 46 are independent apparatus and article of manufacture claims, respectively, reciting essentially the same limitations as the method steps of claim 1. We consider claim 1 as representative of these three claims.

See Accenture Global Servs. GmbH v. Guidewire Software, Inc., 728 F.3d 1336, 1341 (Fed. Cir. 2013) ("Although [*CLS Bank Int'l v. Alice Corp.*, 717 F.3d 1269 (Fed. Cir. 2013) (en banc)] issued as a plurality opinion, in that case a majority of the court held that system claims that closely track method claims and are grounded by the same meaningful limitations will generally rise and fall together." *Id.* at 1274 n.1 (parenthetical omitted)); *Alice Corp. v. CLS Bank Int'l*, 573 U.S. 208, 226-227 (2014) ("Put another way, the system claims are no different from the method claims in substance.").

Petitioner argues Louch teaches all elements of independent claims 1, 21, and 46. Pet. 19-31. Several elements of claims 1, 21, and 46, as identified in Louch by Petitioner, are undisputed by Patent Owner but other elements are disputed. Below, we address the undisputed elements followed by a discussion of the disputed elements.

a) Undisputed Elements – "monitoring" and "detecting"

Regarding method claim 1, Petitioner identifies the method step of *monitoring … input signals* as taught by Louch's monitoring of "input signals from a plurality of sources associated with the mobile device." Pet. 22 (citing Ex. 1011, 8:24-26). Regarding the method step of *detecting at least one condition based … on at least one of said monitored input signals*, Petitioner argues Louch's disclosure of a "state" falls within the interpretation of a "condition" as recited in the claims and argues "Louch expressly discloses detecting at least one condition (e.g., a 'state') based on at least one the monitored input signals (e.g., 'input from one or more sen-

sors')." Pet. 23-24 (citing Ex. 1011, 8:24-26, 8:33-34, 8:55-57; Ex. 1021 ¶ 119).

Patent Owner does not dispute Petitioner's identification of the monitoring and detecting steps in the teachings of Louch. Having reviewed the parties' arguments and supporting evidence in the complete trial record, we are persuaded Louch teaches the monitoring and detecting steps of claim 1 (as well as related recitations of claims 21 and 46). *See* Ex. 1011, 8:24-26 ("In some implementations, the process 400 can begin when input from one or more sensors on the mobile device are used to determine a current state of the mobile device (410)."), 8:33-35 ("the determining can include detecting and determining two or more different states based on inputs from two or more different sensors"), 8:55-57 ("[t]he states can be determined based on sensor inputs, as described in reference to FIGS. 1-4"); *see also* Ex. 1021 ¶ 119.

b) Disputed Elements

We turn next to Patent Owner's dispute regarding the identified teachings of Louch as Petitioner applies them to the identifying and fixing steps of claim 1 (as well as related limitations of claims 21 and 46).

(1) Louch Teaches Identifying a First Pattern as Claimed

A first disputed element of claims 1, 21, and 46 arises in Petitioner's mapping of the identifying step to the teachings of Louch. Claim 1 recites "identifying a first pattern based, at least in part, on said at least one detected condition." Claims 21 and 46 each include a similar recitation.

Regarding the *identifying* step of claims 1, 21, and 46, Petitioner argues Louch teaches identifying a "pat-

tern" in accordance with our interpretation of "pattern." Pet. 24-28. More specifically, Petitioner argues "Louch expressly recites such a 'pattern' of a state and discloses 'the mobile device 100 "learns" **particular characteristics or patterns of the state** of the device and/or the user's interactions with the device.'" Pet. 24 (citing Ex. 1011, 10:3-7). Petitioner identifies three exemplary states (patterns) that are identified by Louch—a first state in which "the mobile device 100 is laying at rest, face up on a flat surface," a second state "when a user has picked up the mobile device 100 from the surface to make a call," and a third state "when the user 110 has raised the mobile device 100 to the user's ear and the mobile device is no longer in motion." Pet. 24-25 (citing Ex. 1011, 3:11-35). Petitioner further explains how Louch identifies these three exemplary patterns:

> Namely, Louch describes a first state (e.g., "laying at rest, face up on a flat surface") that is defined by a pattern including a collection of two parameter values: (1) "a first proximity sensor on the back side of the mobile device 100 sensing proximity to an object," and (2) "a motion sensor not sensing motion of the mobile device 100" (e.g., represented by, "acceleration is below a threshold value"). For the second state (e.g., "a user has picked up the mobile device 100 from the surface to make a call"), the pattern has one parameter value: (1) "the motion sensor sensing motion" (e.g., represented by "acceleration above a threshold value"). The pattern for the third state (e.g., "the user 110 has raised the mobile device 100 to the user's ear and the mobile device is no longer in motion"), like the pattern for the first state, in-

> cludes a collection of two parameter values: (1) "a second proximity sensor located on the front side of the mobile device 100 sensing proximity to an object," and (2) "the motion sensor not sensing motion of the mobile device 100" (e.g., represented by "acceleration is again below a threshold value").

Pet. 25-26 (citing Ex. 1021 ¶¶ 120-122).

Although not directly disputing Petitioner's mapping of the *identifying* step to the teachings of Louch, Patent Owner broadly argues that Louch fails to disclose recognition of patterns as claimed. PO Resp. 25-30. First, Patent Owner argues Louch discusses typical pattern matching as discussed in the background of the '865 patent disclosing only monitoring of *all* sensors to determine the current state and does not discuss monitoring fewer than *all* sensors at any time. PO Resp. 25-27.

Second, Patent Owner argues that Louch does not disclose a first and second pattern but, instead, discloses use of a single pattern in both a learning mode and a recognition mode and contends "[t]he only relationship between these two modes is that the 'learning' mode is used to define and store a pattern such that in 'recognition' mode, that same pattern may be recognized in the live data." PO Resp. 27 (citing Ex. 2005 ¶ 54; Ex. 2003, 109:19-23, 114:14-19). Patent Owner contends Petitioner's reliance on Louch's claim 1 as disclosing identification of two patterns (citing Pet. 17-18) is in error:

> Petitioner's argument that the language of Louch Claim 1 discloses two patterns is contrary to the nature of "learning" and "recognition" modes. As Dr. Allen concedes, "when you're pattern matching you've got the pattern and

> the pattern you eventually match is the same as the one that was before." As a result, Dr. Allen agrees that in Louch Claim 1, "the first movement pattern and the second movement pattern would be the same pattern." Thus, Louch does not disclose two patterns; it merely discloses recording a first pattern and, perhaps years later, recognizing that same pattern in the live data.

PO Resp. 28-29 (internal citations and emphasis omitted); *see also id.* at 33 ("[S]imply recognizing the same stored pattern in current data cannot meet the claim limitation of 'initiat[ing] a process to attempt a recognition of ***a second pattern … based, at least in part, on said first identified pattern***.'") (citing Ex. 2005 ¶ 58).

Third, Patent Owner contends Petitioner identifies the recited first pattern in Louch and identifies the recited second pattern in Louch as the same first pattern that persists for a threshold duration of time and argues Louch's disclosure of a time duration being a factor in identifying a pattern is disclosed in a different embodiment than Louch's disclosure of simply matching a pattern. PO Resp. 29-30. Accordingly, Patent Owner argues "there is no basis for Petitioner to assert that an embodiment defining a single pattern with a duration element can be interpreted as two patterns." *Id.* at 30; *see also id.* at 33-34 ("no single embodiment of Louch uses both of these patterns") (citing Ex. 2005 ¶ 59).

Petitioner responds that Patent Owner's arguments "rest primarily on a flawed understanding of Louch, the improper claim construction of the 'fixing' limitation, and inapposite arguments divorced from the claim language." Reply 16.

We agree with Petitioner. With respect to challenged independent claims 1, 21, and 46, Patent Owner's arguments are directed to limitations not present in the claims—they are "divorced from the claim language" as Petitioner contends (Reply 16). Nothing in claims 1, 21, or 46 even mentions a second pattern, let alone how such a second pattern is identified, or any relationships between the identified first pattern and a second pattern. Likewise, nothing in claims 1, 21, and 46 refers to monitoring fewer than all input sources.

Accordingly, we are persuaded by Petitioner's arguments that Louch teaches the identifying step of claims 1, 21, and 46. *See, e.g.*, Pet. 25-26 (citing Ex. 1021 ¶¶ 120-122); *see also* Pet. 24-25 (citing Ex. 1011, 3:11-35, 10:3-7).

(2) Louch Teaches the Fixing Limitations

The remaining dispute arises regarding Petitioner's mapping of Louch to the fixing limitations. Claim 1 recites, "fixing a subset of varying parameters associated with said first pattern by associating at least one parameter of said subset of varying parameters with said first pattern to represent said at least one detected condition, said varying parameters derived, at least in part, from said monitored input signals." Ex. 1001, 21:3-8. Claims 21 and 46 include a similar recitation. *Id.* at 22:34-39, 24:30-35.

Regarding the fixing limitations of claims 1, 21, and 46 and in accord with Petitioner's proffered construction of the *fixing* limitations, which we adopt, Petitioner contends Louch meets these limitations "by disclosing that the mobile device '"learns," particular characteristics or **patterns of the state of the device**,' where, as explained above, the pattern comprises one or more parameter values (e.g., representing proximity to an

object or sensed movement)." Pet. 28 (quoting Ex. 1011, 10:3-4). Petitioner argues patterns in Louch may include instantaneous values of various sensors as well as signatures or trajectories of changing parameter values and further argues such patterns are stored in the mobile device. Pet. 28-29 (citing Ex. 1011, 2:62-3:25, 10:10-20; Ex. 1021 ¶¶ 126-130). Therefore, Petitioner contends, "Louch discloses associating at least one parameter (e.g., acceleration and/or proximity) with a pattern (a collection of parameters including, for example, acceleration and/or proximity instantaneous values or signatures over time) to represent a condition (e.g., a state of the mobile device)." Pet. 29 (citing Ex. 1021 ¶¶ 128-130). Furthermore, Petitioner argues Louch discloses that the associated parameters defining a state may be a subset of the available parameters (available sensor inputs, signatures, and trajectories). Pet. 29-30 (citing Ex. 1011, 2:20-22, 2:62-3:25; Ex. 1021 ¶¶ 131-137).

Patent Owner argues Louch fails to teach the step of "fixing … by associating …" under Patent Owner's proposed construction of "fixing," which requires "setting the scope of pattern recognition analysis to where a subset of varying parameters match parameter values associated with said first pattern." *See* PO Resp. 31-32. Based on Patent Owner's narrow interpretation of "fixing," Patent Owner argues "'learning' or 'storing' a pattern—nor anything else in Louch results in ***setting the scope of pattern recognition analysis to where the purported first pattern is found***." *Id.* at 31 (citing Ex. 2005 ¶ 57); see also Sur-reply 19.

We do not agree with Patent Owner's argument because, as discussed *supra*, we do not adopt Patent Owner's unduly narrow interpretation of "fixing." We

are persuaded by Petitioner's argument that Louch teaches the fixing limitations based on our interpretation of "fixing." Petitioner has shown that Louch teaches associating a parameter with a pattern to represent a condition because the stored patterns of parameter values in Louch are used to detect the present state of the mobile device and take corresponding control action when the state matches a stored pattern. Pet. 29 (citing Ex. 1011, 10:16-20 ("If the detected state matches one of the patterns, the mobile device 100 can apply to the speakerphone system and/or graphical user interface the corresponding control action to the matching pattern.")). Thus, each parameter value in the stored pattern (i.e., a subset of the varying parameters) is "fixed" by being associated with the first pattern (i.e., by virtue of being stored as a part of the pattern). We agree with Petitioner's argument that "Louch discloses associating at least one parameter (e.g., acceleration and/or proximity) with a pattern (a collection of parameters including, for example, acceleration and/or proximity instantaneous values or signatures over time) to represent a condition (e.g., a state of the mobile device)." Pet. 29 (citing Ex. 1021 ¶¶ 128-130).

For the above reasons, we are persuaded, based on our interpretation of "fixing," Louch teaches the fixing limitations of claims 1, 21, and 46.

c) Conclusion Regarding Anticipation of Claims 1, 21, and 46

For the reasons discussed above, we are persuaded that Louch teaches every element of claim 1. Patent Owner does not separately argue independent claims 21 and 46, apart from the arguments directed to claim 1. *See generally* PO Resp. For similar reasons to claim 1,

we are persuaded that Louch teaches all elements of claims 21 and 46. *See* Pet. 19-31.

Having reviewed the parties' arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that independent claims 1, 21, and 46 are unpatentable as anticipated by Louch.

3. Analysis of Claims 3, 22, and 47

Claim 3 depends from claim 1 and further recites "initiating a process to attempt a recognition of a second pattern in connection with said monitoring said input signals based, at least in part, on said first identified pattern." Claim 22 depends from claim 21 and recites a similar limitation to that of claim 3. Claim 47 depends from claim 46 and recites a similar limitation to that of claim 3. Petitioner identifies the limitations of claims 3, 22, and 47 in Louch. Pet. 32-35.

In a first mapping to the disclosures of Louch, Petitioner argues Louch teaches recognizing a second pattern, based on a first pattern, by its disclosure of claim 1 in which Louch expressly discloses "after the recording of the first movement pattern in the learning mode, and during an automatic control mode, detecting a second movement pattern of the mobile device." Pet. 33 (emphasis omitted) (quoting Ex. 1011, 12:29-32). In a second mapping to the disclosures of Louch, Petitioner further argues a second disclosure of Louch teaches recognition of a second pattern as claimed because Louch teaches detecting a first pattern for a specified duration of time constitutes detecting a second pattern based on the first pattern. Pet. 33-35. Specifically, Petitioner argues,

> after first identifying a first pattern corresponding to the state or condition of "the mobile device 100 has been raised by the user 110 by twenty feet," the Louch system further initiates a process to attempt a recognition of a second pattern corresponding to the state of "the mobile device 100 has been raised by the user 110 by twenty feet for a[n] interval exceeding five seconds."

Pet. 34 (citing Ex. 1011, 5:21-32) (alteration in original). Petitioner contends this disclosure of Louch detects the second pattern based on the first pattern as claimed and based on monitoring of input signals (varying parameters). Pet. 34-35.

Responsive to Petitioner's first proposed mapping, Patent Owner argues the second pattern Petitioner alleges to be disclosed by Louch's claim 1 is not a different pattern from the first pattern but, instead, is the same first pattern stored during the learning mode that is merely detected or matched by the present parameter values of the mobile device during the automatic control mode. PO Resp. 33. Patent Owner argues "simply recognizing the same stored pattern in current data cannot meet the claim limitation" of claims 3, 22, and 47. *Id.* (citing Ex. 2005 ¶ 58). Responsive to Petitioner's second proposed mapping, Patent Owner argues the use of a time duration to identify a second pattern based on a first pattern improperly combines two alternative embodiments of Louch, which is alleged to be improper because anticipation requires all elements are found in a single embodiment of the prior art reference. *Id.* at 33-36.

Regarding its first mapping, Petitioner argues the claims do not require that the first and second patterns

be different and, further argues, even if the patterns are required to be different, the first and second patterns, as identified by Petitioner in Louch, are different because they arise from two different sources: "a first pattern recorded in the storage device and a second pattern in 'live data.'" Reply 20-21. Petitioner contends that Louch's claim 1's recitation comparing the first and second patterns would be unnecessary if the two patterns were the same and, thus, the two patterns are not always the same. Reply 21. Regarding the second mapping, Petitioner argues adding a duration threshold to the first pattern to identify a second pattern is not in a separate embodiment of Louch as Patent Owner contends but, instead, Louch uses both the first and second pattern in a single embodiment. Reply 21-23. Specifically, Petitioner argues that in identifying a second pattern, which constitutes a first pattern being detected for a threshold time duration, the system must first recognize the starting time at which the first pattern is recognized and, thus, Louch uses both the first pattern and the second pattern in the same embodiment. Reply 22-23.

Patent Owner further argues Petitioner's argument that the claims do not require the first and second patterns be different is untimely and argues that Petitioner's Reply fails to address Patent Owner's arguments regarding the first pattern with a specified duration fails to meet the claim requirements. Sur-reply 20.

We are persuaded by Petitioner's argument that Louch teaches the step of "initiating a process to attempt a recognition of a second pattern in connection with said monitoring said input signals based, at least in part, on said first identified pattern." First, we determine that nothing in this recitation requires that the first and second patterns be different. Petitioner's ar-

gument in that regard is not untimely but rather is in direct response to Patent Owner's argument that the first and second patterns identified by Petitioner's first mapping are the same pattern (i.e., they are *not* different patterns). *See* PO Resp. 33. Petitioner's argument is not a new argument but, instead, merely supports its earlier argument in the Petition in response to Patent Owner's argument. *See* Pet. 33.

Second, we are persuaded that Petitioner's second mapping meets the claim limitation—the second mapping in which Petitioner argues the first pattern combined with a threshold time duration constitutes the second pattern. *See* Pet. 33-35. As Petitioner observes, Louch discloses detecting the first pattern, which also determines a start time for detecting the possible second pattern after a sufficient time duration of the first pattern being maintained. *See* Reply 21-23. In other words, a second pattern is detected (identified) after a sufficient amount of time sensing the first pattern. Thus, both the first pattern and second pattern (the first pattern maintained for a specified time duration) are sensed by the same embodiment of Louch. Furthermore, as above, the first and second patterns in this second mapping, even if considered the same pattern, meet the claim limitations that do not require the patterns be different.

Having reviewed the parties' arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that dependent claims 3, 22, and 47 are unpatentable as anticipated by Louch.

4. Analysis of Claims 4 and 23

Claim 4 depends from claim 3 and further recites "wherein said second pattern is recognized in a reduced

set of varying parameters derived from said monitored input signals in response, at least in part, to said fixing of said subset of varying parameters." Claim 23 depends from claim 22 and recites a similar limitation to that of claim 4.

Petitioner contends a "reduced set of varying parameters" used to recognize the second pattern may include the same set of parameters used to recognize (identify) the first pattern or may even include additional input signals beyond those used to identify the first pattern so long as the reduced set is fewer than all the available input signals. *See* Pet. 35-36. Based on this interpretation of "reduced set," Petitioner argues Louch teaches this limitation where, for example, the second pattern is recognized by the sensors used to recognize the first pattern plus a specified duration of time (i.e., an additional varying parameter). Pet. 37.

We are not persuaded by Petitioner's argument. In particular, Petitioner has failed to show where Louch teaches that the second pattern is recognized from a set of parameters that is reduced "*in response to*" (or due to) the fixing step. As discussed *supra*, based on Petitioner's interpretation of "fixing," an interpretation we adopt, we agree with Petitioner that Louch teaches associating a parameter with a pattern to represent a condition because the stored patterns of parameter values in Louch are used to detect the present state of the mobile device and perform a corresponding control action when the state matches a stored pattern. Pet. 29 (citing Ex. 1011, 10:16-20 ("If the detected state matches one of the patterns, the mobile device 100 can apply to the speakerphone system and/or graphical user interface the corresponding control action to the matching pattern.")); *see also* Section II.D.2.b.2. Petitioner has not persuaded us that the proposed reduction of the

number of parameters is "*in response to*" the fixing step. In other words, the "fixing" step is identified in Louch by Petitioner as merely associating a subset of parameters with a pattern to represent a condition but Petitioner has not identified a teaching in Louch that the reduction in parameters used to recognize a next state (i.e., recognizing a second pattern) is in response to this "associating" function.

For the above reasons, having reviewed the parties' arguments and supporting evidence, we are *not* persuaded that Petitioner has proven by a preponderance of the evidence that claims 4 and 23 are unpatentable as anticipated by Louch.

5. Analysis of Claims 2, 15-17, 28, and 29

Claims 2 and 15-17 depend from claim 1, and claims 28 and 29 depend from claim 21. Petitioner identifies the limitations of these claims in Louch. Pet. 31-32, 38-41. Patent Owner does not dispute Petitioner's arguments regarding claims 2, 15-17, 28, and 29 apart from the above arguments directed to claims 1 and 21.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that claims 2, 15-17, 28, and 29 are unpatentable as anticipated by Louch. *See* Pet. 31-32, 38-41.

6. Conclusion Regarding Anticipation by Louch

For the above reasons, we are persuaded by a preponderance of the evidence that Petitioner has proven that claims 1-3, 15-17, 21, 22, 28, 29, 46, and 47 are unpatentable as anticipated by Louch. We are *not* persuaded that claims 4 and 23 are unpatentable as anticipated by Louch.

E. Obviousness over Louch and Nadkarni

Petitioner argues dependent claims 5-10, 18-20, 24-27, 30, and 48-53 are unpatentable as obvious over the combination of Louch and Nadkarni. Pet. 41-61. Dependent claims 5-10, 18-20, 24-27, 30, and 48-53 depend, directly or indirectly, from one of independent claims 1, 21, and 46.

Petitioner argues Louch and Nadkarni are in the same field of endeavor, argues both Louch and Nadkarni are pertinent to the problem addressed by the '865 patent, and articulates reasons for the proposed combination of Louch and Nadkarni. Pet. 41-45. Patent Owner does not dispute Petitioner's reasons for combining the references. Having reviewed Petitioner's arguments (Pet. 41-45), we are persuaded Petitioner has articulated a reason for combining Louch and Nadkarni based on rational underpinnings.

1. Claims 5, 24, and 48

Claim 5 depends from claim 3 and further recites,

> capturing a snapshot of said monitored input signals in response to said detection of said at least one condition, said monitored input signals defining at least one context–related information stream; and

correlating said snapshot with said second pattern in a database. Ex. 1001, 21:27-33. Claims 24 and 48 depend from claims 23 and 47, respectively, and recite similar limitations. *Id.* at 22:40-44, 24:41-48. Petitioner identifies these limitations in Louch.[9] Pet. 45-47. Spe-

[9] We note that, although Petitioner challenges claims 5, 24, and 48 as obvious over the combination of Louch and Nadkarni,

cifically, Petitioner argues Louch discloses capturing a snapshot "by disclosing detecting and tracking 'a **current** state' of the mobile phone." Pet. 45 (citing Ex. 1011, 8:24-26). Petitioner contends Louch discloses snapshots are continuously captured "to obtain instantaneous readings to track the current state/state change of the mobile device." Pet. 45-46. Petitioner further argues that this capture of a snapshot is in response to detected a condition (detecting a first state) because,

> Louch's system keeps capturing snapshots by monitoring and receiving sample values from the sensors "to determine a current state of the mobile device (410)" and "detect[] a duration for a certain state (e.g., position, or orientation) of the mobile device 100."

Pet. 47 (citing Ex. 1011, 8:24-26, 5:7-10; Ex. 1021 ¶¶ 157-162) (alteration in original).

Patent Owner argues, accepting Petitioner's premise that snapshots are continuously captured, Louch cannot meet the claim limitation because such continuous capture is not "in response" to anything. PO Resp. 38-39.

Petitioner replies that "the '865 patent itself discloses snapshots are continuously captured." Reply 27 (citing Ex. 1001, 10:60-11:10). In particular, Petitioner argues claim 7 of the '865 patent recites that a snapshot is a "snap shot of at least one context–related information stream" and that the '865 patent Specification discloses a continuous context stream. Reply 27 (citing Ex. 1001, 1060-1110).

Petitioner's analysis of these claims does not rely on Nadkarni for any teachings in the proposed combination.

Patent Owner disputes Petitioner's characterization of the '865 patent as disclosing continuous snapshots. Sur-reply 23-24. Patent Owner argues that, although Petitioner's argument suggests that a continuous context stream is a snapshot as recited in claim 7 of the '865 patent, the language of claim 7 actually recites that the snapshot is *of* a context stream. *Id.* at 24.

We are not persuaded by Petitioner's arguments. In particular, we are not persuaded that continuously tracking a current state of a mobile device, as disclosed by Louch, meets the limitation of capturing a snapshot. Regardless, even assuming, *arguendo*, that a computer that is analyzing data is understood as continuously capturing snapshots, we agree with Patent Owner that such continuous capturing of snapshots is not "in response" to anything. More specifically, such continuous capture of snapshots is not "in response to said detection of said at least one condition" as required by these claims. For the above reasons, having reviewed the parties' arguments and supporting evidence, we are *not* persuaded that Petitioner has proven by a preponderance of the evidence that claims 5, 24, and 48 are unpatentable as obvious over the combination of Louch and Nadkarni.

2. Claims 6-10, 18-20, 25-27, 30, and 49-53

Patent Owner does not separately dispute Petitioner's arguments directed to these claims apart from Patent Owner's arguments directed claims 1, 21, and 46.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that dependent claims 6-10, 18-20, 25-27, 30, and 49-53 are

unpatentable as obvious over the combination of Louch and Nadkarni. *See* Pet. 41-61.

F. Obviousness over Louch, Nadkarni, and Greenhill

Petitioner argues dependent claims 12-14 are unpatentable as obvious over the combination of Louch, Nadkarni, and Greenhill. Pet. 62-69. Dependent claims 12-14 depend indirectly from independent claim 1. Petitioner articulates reasons for the proposed combination of Louch, Nadkarni, and Greenhill. Pet. 62-66. Patent Owner does not separately dispute Petitioner's arguments directed to these claims apart from Patent Owner's arguments directed claim 1.

Having reviewed Petitioner's arguments and supporting evidence, we are persuaded by a preponderance of the evidence that Petitioner has proven that dependent claims 12-14 are unpatentable as obvious over the combination of Louch, Nadkarni, and Greenhill. *See* Pet. 62-69 (citing Ex. 1009 ¶¶ 36, 47, 50, 51, 53-55, 59, 87, 89, 139, 322, 323, code (54), Fig. 1; Ex. 1011, 10:44-66, 11:37-44, Fig. 3; Ex. 1021 ¶¶ 238-252, 254-259).

III. CONCLUSION[10]

For the foregoing reasons, we determine that Petitioner has shown, by a preponderance of the evidence,

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[10] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding. See* 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2) (2012).

that claims 1-3, 6-10, 12-22, 25-30, 46, 47, and 49-53 of the '865 patent are unpatentable. We further determine that Petitioner has *not* proven by a preponderance of the evidence that claims 4, 5, 23, 24, and 48 are unpatentable.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), claims 1-3, 6-10, 12-22, 25-30, 46, 47, and 49-53 of U.S. Patent No. 8,768,865 B2 are held unpatentable;

FURTHER ORDERED that claims 4, 5, 23, 24, and 48 are *not* held unpatentable; and

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

In summary:

Claims	35 U.S.C. §	Reference(s)/Basis	Claims Shown Unpatentable	Claims Not shown Unpatentable
1-4, 15-17, 21-23, 28, 29, 46, 47	102	Louch	1-3, 15-17, 21, 22, 28, 29, 46, 47	4, 23
5-10, 18-20, 24-27, 30, 48-53	103	Louch, Nadkarni	6, 8-11, 18-20, 25, 27, 30, 48, 51-53	5, 24, 48
12-14	103	Louch, Nadkarni, Greenhill	12-14	

Overall Outcome			1-3, 6-10, 12-22, 25-30, 46, 47, 49-53	4, 5, 23, 24, 48

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APPENDIX E

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

IPR2018-01460
Patent 9,024,418 B2

APPLE INC.,

Petitioner,

v.

QUALCOMM INC.,

Patent Owner.

Paper 50
Date: March 12, 2020
PUBLIC VERSION

Before
MICHELLE N. WORMMEESTER,
AMANDA F. WIEKER, and AARON W. MOORE,
Administrative Patent Judges.
MOORE, *Administrative Patent Judge.*

JUDGMENT
FINAL WRITTEN DECISION
Determining Some Challenged
Claims Unpatentable
35 U.S.C. § 318(a)

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* * *

I. INTRODUCTION

A. Background

Apple Inc. ("Petitioner") filed a Petition for *inter partes* review of claims 1-5, 8-10, and 12-20 of U.S. Patent No. 9,024,418 B2 (Ex. 1001, "the '418 patent"). Paper 2 ("Pet."). Qualcomm Inc. ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp.").

On March 15, 2019, we instituted an *inter partes* review of claims 1-5, 8-10, and 12-20. Paper 7 ("Inst. Dec.") 20. Patent Owner then filed a Patent Owner Response (Paper 20, "PO Resp."), Petitioner filed a Reply (Paper 36, "Pet. Reply"), and Patent Owner filed a Sur-Reply (Paper 39, "PO Sur-Reply").

An oral hearing was held on December 12, 2019, and a transcript of the hearing is included in the record. Papers 46, 47 ("Tr.").

The Board has jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. For the reasons that follow, we determine that Petitioner *has* shown by a preponderance of the evidence that claims 3, 9, 10, and 14 of the '418 patent are unpatentable, and that Petitioner *has not* shown that claims 1, 2, 4, 5, 8, 12, 13, 15-19, and 20 are unpatentable.

B. Related Matters

The '418 patent was at issue in *Qualcomm Incorporated v. Apple Incorporated*, Civil Action No. 3:17-CV-02402 (S.D. Cal.), when the Petition was filed, but that litigation has since been dismissed. *See* Pet. 1; Petitioner's Updated Mandatory Notices (Paper 16) 1.

C. The '418 Patent

The '418 patent concerns "[a] local interconnect structure … that includes a gate-directed local interconnect coupled to an adjacent gate layer through a diffusion-directed local interconnect." Ex. 1001, Abstract.

The claimed structure can be explained with reference to Figure 4A, annotated with colors below:

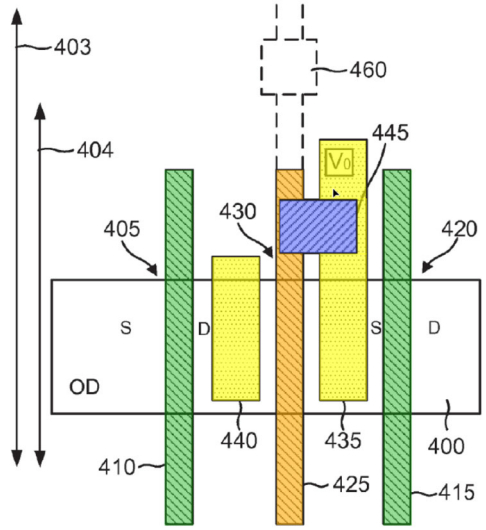

FIG. 4A

Figure 4A shows "the layout for a pair of transistors in a continuous diffusion region including a blocking transistor." Ex. 1001, 3:9-10.

This embodiment[1] includes continuous diffusion layer 400, which forms the basis for two transistors. The transistors consist of gate layers 410 and 415, shown in green, and the associated source and sink regions in the continuous diffusion layer. An additional

[1] *See* Ex. 1001, 5:66-7:3.

gate layer 430, shown in orange, operates as a blocking transistor. The source region for the right transistor is provided with voltage by local interconnect 435, shown in yellow, which is biased by via V_0. Local interconnect 445 couples interconnect 435 and gate layer 430. The gate layers and interconnect 435 are "gate directed," which in this context means that their long dimensions are perpendicular to the length of the continuous diffusion layer; the local interconnect 445 is "diffusion directed," which in this context means that its long dimension is parallel to the length of the continuous diffusion layer.

The '418 patent explains that because "[v]ias require a certain separation between them … the square-shaped local interconnect 460 of the prior art"—shown in dashed outline in Fig 4A—"had to be displaced vertically from via V_0 to accommodate the via pitch," and that the '418 patent's "diffusion-directed local interconnect 445 eliminates the need for such a vertically-displaced coupling to gate layer 425" and thus "has an advantageously reduced cell height 404 for transistors 405 and 420 as compared to conventional cell height 403, which enhances density." Ex. 1001, 6:60-7:3.

D. The Claimed Subject Matter

Independent claims 1, 12, and 17, reproduced below, illustrate the subject matter addressed in this proceeding. Claim 1 is directed to a circuit, claim 12 is directed to a method corresponding to the circuit of claim 1, and claim 17 is directed to a similar circuit, but drafted using means-plus-function terminology:

1. A circuit comprising:

a first gate layer arranged according to a gate layer pitch between a second gate layer and a third gate layer;

a first gate-directed local interconnect arranged between the first gate layer and the second gate layer;

a second gate-directed local interconnect arranged between the first gate layer and the third gate layer; and

a diffusion-directed local interconnect layer configured to couple the first gate layer to one of the first and second gate-directed local interconnects, wherein the first gate-directed local interconnect, the second gate-directed local interconnect, and the diffusion-directed local interconnect are all located between a lowermost metal layer and a semiconductor substrate for the circuit.

12. A method, comprising:

forming a first gate layer over a semiconductor substrate according to a gate layer pitch between adjacent second and third gate layers;

forming a first gate-directed local interconnect between the first gate layer and the second gate layer;

forming a second gate-directed local interconnect between the first gate layer and the third gate layer; and

forming a diffusion-directed local interconnect to couple one of the first and second gate-connected local interconnects to the first gate

layer, wherein the first gate-directed local interconnect, the second gate-directed local interconnect, and the diffusion-directed local interconnect are all located between the semiconductor substrate and an adjacent lowermost metal layer.

17. A circuit comprising:

a continuous diffusion region within a semiconductor substrate;

a pair of gate layers configured to form gates for a pair of transistors having source/drain terminals in the continuous diffusion region;

a third gate layer arranged between the pair of gate layers to form a gate for a blocking transistor;

a gate-directed local interconnect configured to couple to a drain/source terminal for a transistor in the pair of transistors; and

means for coupling the gate-directed local interconnect to the third gate layer, wherein the gate-directed local interconnect and the means are both located between the semiconductor substrate and an adjacent lower-most metal layer.

Ex. 1001, 9:6-19, 10:5-18, 10:38-52.

E. Evidence Relied Upon

Petitioner relies on the following references:

Reference		Exhibit
Rashed	US 8,618,607 B2	1005
Lu	US 9,123,565 B2	1006
Nauta	Bram Nauta, A CMOS Transconductance-C Filter Technique For Very High Frequencies, *IEEE Journal of Solid-State Circuits*, Vol. 27, Issue 2 (Feb 1992)	1007

Petitioner also relies on a Declaration of David Kuan-Yu Liu, filed as Exhibit 1003 ("Liu Decl."). Patent Owner relies on a Declaration of Dr. Pradeep Lall, filed as Exhibit 2002 ("Lall Decl.").

1. Rashed

Rashed describes "semiconductor devices formed in and above a continuous active region and a conductive isolating structure formed above the active region between the devices." Ex. 1005, 1:13-15.

One example is shown in Figure 4A, which is reproduced below. As shown, the source regions of adjacent transistors are coupled to power rail 140H by conductive structures 144 (in yellow). *See* Ex. 1001, 6:21-36. Isolating electrode 150PG (in orange) is positioned between adjacent source regions of the continuous active region, and is also connected to the power rail. *See id.*, 5:17-20, 6:21-36. Gate structures 130 (in green) are formed across the active region between the source regions and corresponding drain regions. *See id.* 4:60-66.

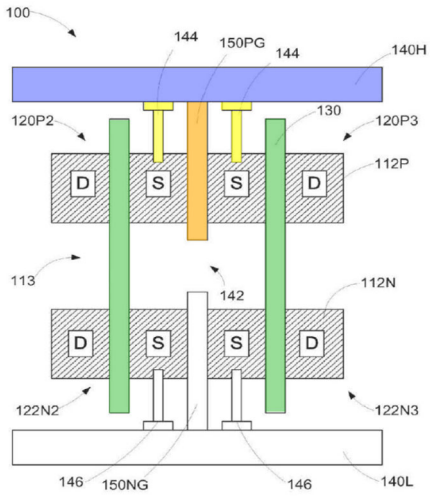

Figure 4A

Figure 4A of Rashed is a schematic depiction of an exemplary semiconductor device. See Ex. 1001, 3:29-31.

2. Nauta

Nauta is an article describing "CMOS circuits for integrated analog filters at very high frequencies." Ex. 1007, Abstract. In pertinent part, it describes a common-mode voltage inverter circuit, shown in Fig. 2(b), in which the gates of both the PFET and NFET of the inverter are tied to the drains of both the PFET and NFET. *See* Ex. 1003 (Liu Decl.) pp. 56-58.

F. Grounds of Unpatentability

This trial was instituted on the following grounds:

Reference(s)	35 U.S.C. §	Claim(s) Challenged
Rashed	102	1-3, 5, 8, 9, 12-14, 16-19
Rashed	103	1-3, 5, 8, 9, 12-14, 16-19

Rashed, Lu	103	4, 15, 20
Rashed, Nauta	103	10

II. ANALYSIS

We discuss below the level of skill in the art, claim construction, antedating Rashed and Lu, the patentability of the present claims.

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art "would have had a Master's of Science Degree (or a similar technical Master's Degree, or higher degree) in an academic area emphasizing electrical engineering or computer engineering with a concentration in semiconductors or, alternatively, a Bachelors Degree (or higher degree) in an academic area emphasizing electrical or computer engineering and having two or more years of experience in integrated circuit design and/or semiconductor processing." Pet. 10-11. Petitioner adds that "[a]dditional education in a relevant field, such as computer engineering, or electrical engineering, or industry experience may compensate for a deficit in one of the other aspects of the requirements stated above." *Id.* at 11.

Patent Owner asserts that a person of ordinary skill in the art "would have had (a) a Bachelor's of science degree in an engineering discipline or physics, or a closely-related field, and at least two years of work or research experience in the field of semiconductor design or fabrication, or (b) a Master's of science degree in an engineering discipline or physics, or a closely related field, and at least one year of work or research experi-

ence in that same field." PO Resp. 5 (citing Ex. 2002 ¶¶ 33-36).

Although the parties do not agree on the correct formulation, neither argues why theirs is superior or that the selection of one or the other makes a difference in the outcome of this case. Under these circumstances, we adopt Petitioner's characterization of the level of ordinary skill in the art, which we find to be generally consistent with the disclosures of the patent and the cited prior art.

B. Claim Construction

In *inter partes* reviews filed before November 13, 2018, such as this one, claims of an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. *See* 37 C.F.R. § 42.100(b) (2017); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2142-46 (2016); 83 Fed. Reg. 51,340. Under that standard, claim terms are generally given their ordinary and customary meaning, as would have been understood by one of ordinary skill in the art in the context of the entire disclosure. *See In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). We address below the terms that at least one party identified as requiring construction.

1. "means for coupling the gate-directed local interconnect to the third gate layer"

Claim 17 recites "means for coupling the gate-directed local interconnect to the third gate layer, wherein the gate-directed local interconnect and the means are both located between the semiconductor substrate and an adjacent lower-most metal layer." The Petition argued that "[t]he 'means' in 'means for

coupling' encompasses a 'diffusion-directed local interconnect.'" Pet. 13 (citing Ex. 1001, 5:62-64, 6:36-38, 7:9-12; Figs. 4A, 4B, 5A, 5B).

Patent Owner asserts that "[i]n the co-pending litigation, Petitioner agreed to a proper identification of corresponding structure as: 'a diffusion-directed local interconnect as described at 7:8-12, Fig. 4A, 3:9-14, Fig. 4B, 3:15-19, 7:12-16, 5:62-64, 6:36-39, 8:9-11, 2:48-52, Figs. 5A, 5B, 6A, 7A, or 7B, and equivalents thereof.'" PO Resp. 6 (citing Ex. 2001, 26-28). Patent Owner argues that "[f]or each corresponding structure, the diffusion-directed local interconnect—and the diffusion-directed local interconnect alone—performs the claimed function" and that "[n]one of the diffusion-directed local interconnects rely upon other structures, for example an intermediate connection, to complete the physical connection between the gate-directed local interconnect or gate layer." *Id.* at 6-7 (citing Ex. 1002 ¶ 42).

Petitioner's Reply does not address this issue, and we agree with Patent Owner that the corresponding structure is a diffusion-directed local interconnect as described in the '418 patent at 7:8-12, 3:9-14, 3:15-19, 7:12-16, 5:62-64, 6:36-39, 8:9-11, 2:48-52 and shown in Figs. 4A, 4B, 5A, 5B, 6A, 7A, and 7B, as well as equivalents thereof. We note that neither party has addressed the scope of the "equivalents thereof."

2. "configured to" and "forming … to"

Patent Owner argues that "the phrase 'configured to' in claim 1 should be construed as 'requiring structure designed to or configured to accomplish the specified objective, not simply that they can be made to serve that purpose.'" PO Resp. 7. According to Patent Owner, the Federal Circuit has explained that "configured to" requires that the claimed structures "are de-

signed or configured to accomplish the specified objective, not simply that they can be made to serve that purpose." PO Resp. 8 (citing *Aspex Eyewear, Inc. v. Marchon Eyewear, Inc.*, 672 F.3d 1349 (Fed. Cir. 2012)). Patent Owner further argues that, for similar reasons, "the 'forming … to' language of Claim 12 should be given the same interpretation." *Id.*

Petitioner does not address this issue, and we agree with Patent Owner that, on this record, "configured to" and "formed to" mean that the structure is designed or constructed to accomplish the specified objective. *Cf. In re Giannelli*, 739 F.3d 1375, 1379 (Fed. Cir. 2014) (distinguishing between "configured to" and "capable of" or "suitable for"). As explained below, however, we do not agree with Patent Owner that this interpretation distinguishes the claims over Rashed.

3. "diffusion-directed local interconnect"

Patent Owner contends that "[i]n the litigation, Patent Owner and Petitioner agreed that ['diffusion-directed local interconnect'] means: 'a local interconnect that has a polygonal footprint with a longitudinal axis that is parallel to the longitudinal axes of the polygonal footprints of the diffusion regions.'" PO Resp. 10 (citing Ex. 2001, 21, 31).

Petitioner does not respond to Patent Owner's argument, and, finding Patent Owner's proposed construction consistent with the definition in the Specification (*see* Ex. 1001, 4:39-43), we adopt it.

4. "first gate layer for the second transistor to a power supply node"

Patent Owner argues that claim 5 "includes an obvious typographical error in the phrase 'first gate layer for the second transistor' and would be readily under-

stood by a POSITA as 'first gate layer for the blocking transistor.'" PO Resp. 10 (citing Ex. 2002 ¶ 43). Patent Owner asserts that claim 2, "from which claim 5 depends, provides antecedent basis for claim 5 and states that 'the first gate layer comprises a gate for a blocking transistor' and "also recites an 'adjacent second transistor,' that is therefore not the same as the 'blocking transistor.'" *Id.* Petitioner responds that "a Patent Owner Response is not the proper vehicle for such a corrective amendment," which should instead be pursued in a Motion to Amend. Pet. Reply 26.

Given that the parties both acknowledge the claim is defective as written,[2] that Patent Owner's proposed "construction" reflects a change more appropriately pursued by other means, such as a certificate of correction or motion to amend, and that neither party offers thorough analysis or argument as to how or why this claim should, or should not, be construed as Patent Owner proposes, we conclude that we are not able to construe claim 5 on this record. We further determine that "the proper course for [us] to follow" under these circumstances is to "conclude that [we cannot] reach a decision on the merits with respect to whether petitioner had established the unpatentability" of claim 5. *Samsung Elecs. Am., Inc. v. Prisua Engr. Corp.*, 948 F.3d 1342, 1353 (Fed. Cir. 2020); *see In re Steele*, 305 F.2d 859, 862 (Cust. & Pat. App. 1962) (explaining that prior art rejections should not be based on "speculation as to meaning of the terms employed and assumptions as to the scope of such claims"). Petitioner, therefore,

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[2] *See, e.g.*, Pet. 39-40 ("[T]he phrase 'first gate layer for the second transistor,' in claim 5 is inconsistent with claim 2, and therefore should not be given patentable weight."); PO Resp. 10 (acknowledging the "obvious typographical error").

has not met its burden to demonstrate, by a preponderance of the evidence, that claim 5 unpatentable.

C. Antedating Rashed and Lu

Patent Owner argues that "[t]he inventors' invention of [claims 1, 2, 4, 5, 8, 12, 13, 15-18, and 20] antedates both Rashed and Lu." PO Resp. 11.[3] In particular, Patent Owner argues that the inventors conceived of the subject matter of these claims "no later than January 17, 2012" and that they "were reduced to practice no later than June 28, 2012 through fabrication and testing of a test chip embodying the [claimed subject matter]." *Id.*

1. Sufficiency of Patent Owner's Conception Evidence

An inventor can swear behind a reference by proving conception of the invention before the effective filing date of the reference and diligent reduction of the invention to practice after that date. *See Apator Miitors ApS v. Kamstrup A/S*, 887 F.3d 1293, 1295 (Fed. Cir. 2018) (citing *Perfect Surgical Techniques, Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1007 (Fed. Cir. 2016)). "[W]hen a party seeks to prove conception through an inventor's testimony," however, "the party must proffer evidence, 'in addition to [the inventor's] own statements and documents,' corroborating the inventor's testimony." *Apator Miitors*, 887 F.3d at 1295 (quoting *Mahurkar v. C.R. Bard, Inc.*, 79 F.3d 1572, 1577 (Fed. Cir. 1996)).

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[3] Patent Owner does not seek to antedate challenged claims 3, 9, 10, 14, and 19, and we consider patentability of those claims in light of Rashed and Lu in Section II.D. Due to the claim construction problem, we do not consider whether claim 5 can antedate the references.

Patent Owner offers testimony by "[i]nventors Giridhar Nallapati and John Zhu … that by January 17, 2012, the inventors had a definite and permanent idea of the complete and operative invention disclosed in the '418 Patent." PO Resp. 12 (citing Ex. 2060 (Nallapati Declaration) ¶¶ 2-3; Ex. 2061 (Zhu Declaration) ¶¶ 2-3).

Patent Owner further argues that the inventor testimony "is corroborated by a January 17, 2012 GDS file," named "qptc20_1t_top_ fill_no215_20120 117.gds.gz," corresponding to "a test chip known as QPTC20_1T, which contains a test device known as 'Device Under Test 16' ('DUT 16') embodying the invention disclosed in the '418 Patent." PO Resp. 12 (citing Ex. 2060 ¶¶ 4, 77-107; Ex. 2061 ¶¶ 4, 41-71; Ex. 2002 (Lall Decl.) ¶¶ 44-67). Patent Owner contends that "DUT 16 contains multiple repetitions of structures known internally as 'MP over OD' or 'Continuous OD'" and that "DUT 16 embodies all elements" of the subject claims. PO Resp. 12.

According to Patent Owner, "[t]he date of the GDS file 'qptc20_1t_top_fill_no215_20120117.gds.gz' is verified in four ways": (1) "multiple declarants testify that the file name itself—here '20120117'—indicates the finalization date of the file based on Qualcomm's naming convention practice," (2) "page 1 of [Ex. 2005] and page 1 of [Ex. 2006] are screenshots that show the Qualcomm file server where the file is stored showing the last modified date as 9 am January 18, 2012," (3) Ex. 2010 "is a contemporaneous e-mail from the project lead Dr. Frank (Bin) Yang stating 'the final version QTC20_1T taped out to TSMC has been completed on Tuesday, Jan. 17th 2012,' which Dr. Yang testifies is accurate and refers to [the] GDS file," and (4) Ex. 2007 is "screenshots showing submission of the same file through Qualcomm's Tapeout Manager Program with a

date stamp of January 17, 2012." PO Resp. 12-13 (citing Ex. 2060 ¶¶ 7, 112; Ex. 2061, ¶¶ 7, 76; Ex. 2062, ¶¶ 7-9, 58-62; Ex. 2010, 1-2; Ex. 2007, 1, 8).

Petitioner argues that Patent Owner "relies on uncorroborated testimony from the inventors of the '418 patent … to support its allegation that the [claimed subject matter was] conceived prior to the effective dates of Rashed and Lu," that "such uncorroborated inventor testimony is insufficient to show conception," and that "thus [Patent Owner]'s argument fails." Pet. Reply 6.

Petitioner also argues that Patent Owner "fails to identify any evidence to corroborate that Nallapati and Zhu alone were, in fact, the individuals that conceived of the alleged invention." *Id.* at 7 (emphasis omitted). Petitioner contends that Patent Owner "does not allege that any information in the 'January 17, 2012 GDS file,' or any other evidence of record in the present proceeding, shows that Nallapati and Zhu were the individuals that conceived of the subject matter in the January 17, 2012 GDS file." *Id.* at 8 (emphasis omitted).

Petitioner further argues that "[t]he screenshots in Ex. 2006, which were created by Dr. Zhu, are uncorroborated inventor testimony, and are thus insufficient to support a showing of conception." Pet. Reply 9. Petitioner argues that "[b]y selecting which layers were visible and invisible [in the screenshots], Dr. Zhu effectively provides testimony directing viewers to key features from the GDS file" and "[t]hus, the screenshots in Ex. 2006, which were created by Dr. Zhu, an inventor, specifically for the purposes of Qualcomm's swear-behind argument, should be treated as inventor testimony." *Id.* at 10.

We are not persuaded by Petitioner's arguments. The "rule of reason" analysis applied to corroboration "requires an evaluation of all pertinent evidence when determining the credibility of an inventor's testimony" and, notably, "it is not necessary to produce an actual over-the-shoulder observer" and "sufficient circumstantial evidence of an independent nature can satisfy the corroboration requirement." *Cooper v. Goldfarb*, 154 F.3d 1321, 1330 (Fed. Cir. 1998).

We find that the testimony of the two inventors is not "uncorroborated" because (a) the file provides corroboration of the testimony, (b) the file is dated and the date is corroborated in multiple ways, (c) the inventors' testimony is confirmed by Dr. Yang, who is not an inventor, and the screenshots from the tapeout system, and (d) the testimony and documents are further verified Dr. Ranganathan, who also is not an inventor.

It is true, as Patent Owner observes, that we have only the testimony of the inventors that it was they who actually conceived of the inventive structures, but such is frequently the case. The law does not require independent, conclusive proof that the inventor is the one who had the mental spark of invention; rather, what is needed is "only that the corroborative evidence, including circumstantial evidence, support the credibility of the inventors' story." *E.I. du Pont De Nemours & Co. v. Unifrax I LLC*, 921 F.3d 1060, 1077 (Fed. Cir. 2019) (citing *NFC Tech., LLC v. Matal*, 871 F.3d 1367, 1371 (Fed. Cir. 2017)). The cases do not require "that evidence have a source independent of the inventors on every aspect of conception and reduction to practice" as "such a standard [would be] the antithesis of the rule of reason." *E.I. du Pont De Nemours*, 921 F.3d at 1077 (quoting *Cooper*, 154 F.3d at 1331*); see NFC Tech.*, 871 F.3d at 1372 ("[A]n inventor's conception can be cor-

roborated even though 'no one piece of evidence in and of itself' establishes that fact," and "even through circumstantial evidence," because "[a]t bottom, the goal of the analysis is to determine 'whether the inventor's story is credible.'") (citations omitted).

We find that the evidence offered by Patent Owner, as described above and in the declarations of non-inventors Yang and Ranganathan, is sufficient to support the inventor's story of conception when viewed as a whole, and through the rule of reason lens.

We also do not agree with Petitioner that the screenshots are "inventor testimony." The screenshots are simply views of the large, complex GDS file that remove extraneous structures so that those corresponding to the claims can be viewed clearly. We see no practical difference between inventor Zhu removing irrelevant elements from the view of the file and an inventor directing one to a specific notebook, page, or other material. The evidence is the rendering showing the presence of the relevant structures in the file, which is not testimony. We also note that Petitioner received a copy of the file, without any extraneous structures having been removed, and also had the opportunity to depose Mr. Zhu and reveal any errors in turning the GDS file into more accessible screenshots. *See* Tr. 40:6-7.

As we are not persuaded by Petitioner's argument that Patent Owner relies only on uncorroborated inventor testimony, we turn to whether the evidence reflects invention of the subject matter of claims 1, 2, 4, 8, 12, 13, 15-18, and 20.

2. Conceived Subject Matter

Patent Owner explains that Ex. 2006 "contains screenshots taken by inventor Zhu of portions of 'qptc20_1t_top_fill_no215_20120117.gds.gz' viewed in a GDS viewer" and that Ex. 2016B "contains images taken with a Transmission Electron Microscope ('TEM') showing cross-sections of the DUT 16 structure as fabricated in accordance with the GDS file." PO Resp. 13-14 (citing Ex. 2061 ¶ 7; Ex. 2063 ¶ 8). According to Patent Owner, "as illustrated by [Ex. 2006] and [Ex. 2016B], the DUT 16 structure as specified in the January 17, 2012 GDS file for QPTC20_1T embodies all [of the subject] claims." *Id.* at 14. The Patent Owner Response details how the structures in DUT 16 meet the limitations of claims 1, 2, 4, 8, 12, 13, 15-18, and 20. *See* PO Resp. 13-32; *see also* Ex. 2006 (GDS screenshots); Ex. 2016B (TEM images); Ex. 2002 (Lall Decl.) ¶¶ 44-67; Ex. 2060 (Nallapati Declaration) ¶¶ 74-108; Ex. 2061 (Zhu Declaration) ¶¶ 38-72. We have reviewed and are persuaded by that analysis with respect to claims 1, 2, 4, 8, 12, 13, 15-18, and 20, which Petitioner does not dispute.

Petitioner *does* dispute the analysis for claims 5 and 16, arguing that although Patent Owner "alleges that metal layer 2 is one of the layers that extends into the Vdd / Ground regions shown in teal on the far right on the view above," Petitioner's "investigation of the January 17, 2012 GDS file reveals that this is not the case, and that metal layer 2 in fact does not contact these Vdd / Ground regions." Pet. Reply 17. However, due to the claim construction problem, Petitioner is not able to prove claim 5 unpatentable (*see* Section II.B.4) and, as Patent Owner observes, "[c]laim 16 does not recite a

'power supply node,'[4] and thus Petitioner's argument is applicable, at best, to [c]laim 5." PO Sur-Reply 10.

We conclude that Patent Owner has proven, by a preponderance of evidence, conception of the subject matter of claims 1, 2, 4, 8, 12, 13, 15-18, and 20 prior to the effective dates of Rashed and Lu.

3. Reduction to Practice

To establish an actual reduction to practice, an inventor must prove that he or she (1) constructed an embodiment or performed a process that meets all the claimed limitations of the invention, and (2) determined that the invention worked for its intended purpose. *Cooper v. Goldfarb*, 154 F.3d 1321, 1327 (Fed. Cir. 1998).

Patent Owner argues that the subject matter of claims 1, 2, 4, 8, 12, 13, 15-18, and 20 was "reduced to practice by June 28, 2012, which is sufficient to antedate Rashed's July 2, 2012 filing date [and] Lu's February 27, 2013 filing date." PO Resp. 34.

Specifically, Patent Owner argues that "[b]eginning in February 2012, multiple lots of QPTC20_1T6 test chips were fabricated." PO Resp. 34 (citing Ex. 2060 ¶ 189; Ex. 2061 ¶¶ 96-97; Ex. 2062 ¶¶ 78-79; Ex. 2028B). Patent Owner explains that "[e]ach lot of test chips was fabricated in phases, first fabricating layers from the silicon up to the M1 Metal Layer followed by wafer acceptance testing ('WAT'), then continuing to fabricate additional layers." *Id.* at 34-45 (citing Ex. 2060 ¶ 189;

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[4] Claim 16 recites: "The method of claim 12, further comprising forming a via coupled between the one of the first and second gate directed local interconnects and a first metal layer."

Ex. 2061 ¶¶ 96-97; Ex. 2062, ¶¶ 78-79; Ex. 2028B; Ex. 2060 ¶ 156; Ex. 2062 ¶ 81).

According to Patent Owner, "[c]onsistent with the very purpose of GDS files and TSMC's role as a foundry fabricating chips in accordance with the provided GDS file, each test chip contained the test structures defined in "qptc20_1t_top_fill_no215_20120117.gds.gz." PO Resp. 35 (citing Ex. 2060 ¶¶ 72, 146; Ex. 2061 ¶¶ 36, 109; Ex. 2062 ¶¶ 57, 90). This is confirmed, according to Patent Owner, by "Transmission Electron Microscope (TEM) images … show[ing] the structures of DUT 16 defined in the GDS file … are found in the physical chips." PO Resp. 35 (citing Ex. 2002 ¶¶ 44-67; Ex. 2063 ¶¶ 27-56).

Patent Owner continues that "[a]s of June 28, 2012, the '1st Lot' had been fabricated to include all layers up to the M6 Metal Layer, as indicated by the notation '1P6M' in a June 28, 2012 TSMC status report" and that "[t]hus, by June 28, 2012, the '1st Lot' of QPTC20_1T fabricated through the M6 Metal Layer constituted a physical embodiment of all elements of the subject claims." PO Resp. 35 (citing Ex. 2018, 2; Ex. 2060 ¶¶ 144-145; Ex. 2061 ¶¶ 107-108; Ex. 2062 ¶ 81).

Patent Owner further argues that "QPTC20_1T M1 WAT testing for the '1st Lot,' which was completed and reported to the Qualcomm team by May 24, 2012, demonstrated that the MP over OD concept embodied in the [subject claims] would work for its intended purpose as interconnect structures for an integrated circuit." PO Resp. 36 (citing Ex. 2060 ¶¶ 139-143; Ex. 2061 ¶¶ 103-106; Ex. 2062 ¶¶ 87-89; Ex. 2015).

Patent Owner explains that "[p]rior to fabrication, a particular focus of the inventors in evaluating whether the MP over OD design would function properly was

assessing potential leakage current issues, that testing showed no increased leakage current, and that "[b]ased on the results of this testing, Drs. Nallapati and Zhu testify that they and the Qualcomm team were able to conclude that leakage current was not an issue for the MP over OD design." PO Resp. 36-37 (citing Ex. 2060 ¶¶ 119-120, 135, 142-43; Ex. 2061 ¶¶ 83-84, 99, 105-106; Ex. 2062 ¶¶ 65-66, 89; Ex. 2014C; Ex. 2015).

Petitioner argues that Patent Owner "does not allege that the inventors designed or implemented the structures included in the January 17, 2012 GDS file." Pet. Reply 12. In fact, however, the inventors both testified that their invention was incorporated into the GDS file. *See* Ex. 2060 ¶ 2-4; Ex. 2061 ¶ 2-4.[5]

Petitioner also argues that Patent Owner "provides no information regarding the inventor's involvement in creating [the] GDS file," and that Patent Owner "thus has not shown that the June 28, 2012 test chip, which was allegedly fabricated based on this GDS file, was created by or on behalf of the inventors." Pet. Reply 12. Petitioner similarly argues that "[t]estimony by Dr. Nallapati in his declaration and during his deposition" indicates that others "participated in the design of the January 17, 2012 GDS file." Pet. Reply 12 (citing Ex. 2060 ¶¶ 109, 121; Ex. 2061 ¶ 74; Ex. 1016, 27:11-28:16, 135:20-138:7; Ex. 2007; Ex. 2058).

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[5] *See*, *e.g.*, Ex. 2060 ¶ 2 ("I and the other inventors on the '418 Patent conceived of our invention between August 2011 and January 2012 while overcoming 20 nanometer technology challenges to boost performance and area scaling and subsequently developing test structures in the said 20 nanometer semiconductor node. The invention described in the '418 patent was incorporated into several test structures for a Computer Aided Design (CAD) Graphic Database System 'GDS' file that was finalized on or about January 17, 2012.").

We are not persuaded by these arguments because we see no reason why the inventors would have needed to create the GDS file themselves. It is sufficient for inventorship that they conceived of the claimed structures that were then reduced to practice. That others (e.g., Mr. Gan, Mr. Bucki, and Dr. Yang) were involved in the creation of the GDS file and its submission to the foundry does not negate inventorship. *See, e.g.*, *Trovan, Ltd. v. Sokymat SA, Irori*, 299 F.3d 1292, 1306 (Fed. Cir. 2002) ("Using the services of other Sokymat employees to bond the wire leads to the gold bumps does not change the fact that Gustafson … was the first to reduce the invention to practice."); *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 624 (Fed. Cir. 1985) ("An inventor may use the services, ideas, and aid of others in the process of perfecting his invention without losing his right to a patent.") (quoting *Hobbs v. United States Atomic Energy Comm'n*, 451 F.2d 849, 864 (5th Cir. 1971)).

Petitioner also argues that "Dr. Nallapati was repeatedly asked during his deposition about whether he and the other inventors designed or implemented the structures in the January 17, 2012 GDS file" and that he "refus[ed] to provide any additional details regarding the design process of the January 17, 2012 GDS file." Pet. Reply 13 (citing Ex. 1017, 139:1-144:8). We do not agree. In the cited portion of the transcript, the witness is asked to identify "evidence" that he and the other inventors invented the claimed structures, and the witnesses responded that the declaration "provide[s] evidence that the invention was, indeed, incorporated into the standard cell that is used in the ring oscillator circuit." Ex. 1017, 141:6-9. The witness was correct that the evidence of the invention is the inventor testimony, which is corroborated, as explained

above. The cited testimony does not reflect a refusal to provide "additional details regarding the design process," as Petitioner argues, because the questioning was not seeking "details regarding the design process."

Petitioner additionally argues that Patent Owner has not shown that the invention would have worked for its intended purpose because Patent Owner "does not provide any evidence that preventing or minimizing 'leakage current' was the intended purpose of the" subject claims. Pet. Reply 14-15.

This is also unpersuasive. The invention was intended to reduce the size of the footprint which, by its very structure, it did. The question for the inventors, then, was whether the reduced footprint design could be used in an actual chip (i.e., would the chip have worked), and the specific concern the inventors had in that regard was that "the 20 nanometer processes might not support the MP structures in close proximity to MD2 structures on the opposite side of the gate layer … and there would be undesired leakage current through the unconnected MD2." Ex. 2060 ¶ 119. Inventor Nallapati testified that the results from the testing performed by the foundry confirmed that "the leakage current concerns … for the MP over OD structures were not actually an issue" and that "the MP over OD structures … worked for their intended purpose." *Id.* at ¶ 135.

Preventing or minimizing leakage current need not have been "the intended purpose of the subject claims," as Petitioner argues. Instead, the question was whether the structure for achieving the purpose stated in the patent—increasing the density in a continuous OD lay-

out[6]—would have worked in an actual chip. *See Cooper*, 154 F.3d at 1327 ("When testing is necessary, the embodiment relied upon as evidence of priority must actually work for its intended purpose."). The evidence shows that the inventors, having concluded that leakage current was not a problem, determined that the invention would have worked for its intended purpose of increasing density in a working chip.

4. Word Limit

Petitioner also argues that "Qualcomm submits upwards of sixty exhibits with its [Response], including four fact witness declarations and an expert declaration" and "repeatedly attempts to incorporate by reference arguments and explanation from these declarations." Pet. Reply 26. According to Petitioner, "Qualcomm's swear-behind argument consists almost entirely of conclusory statements alleging that particular claim limitations are shown in Ex. 2006, followed by citations to more detailed explanations in the expert and fact witness declarations." *Id.* at 26-27. Petitioner contends that "[t]his is a clear attempt by Qualcomm to circumvent the 14,000 word limit" and that "[t]he Board should thus consider only the arguments presented in the [Response], and should refuse to consider the arguments incorporated by reference from the various declarations." *Id.* at 27-28.

This is not persuasive. As Patent Owner observes, if Petitioner believed Patent Owner had circumvented the word count limit, "it was obligated to raise the issue

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[6] *See* Ex. 1001, 2:10-18 ("The layout of the local interconnects for the blocking transistors has proven to be awkward and decreases density. Accordingly, there is a need in the art for improved local interconnect layouts.").

with Patent Owner such that Patent Owner could 'take reasonable steps to remedy any such issues before approaching the Board' and then 'raise the issue with the Board promptly after discovering the issue.'" PO Sur-Reply 21 (citing Trial Practice Guide Update (August 2018) § II.A.3). We find that, having failed to follow our guidance, Petitioner has waived this complaint.

Moreover, having reviewed the exhibits, including the declarations, we do not agree that Patent Owner has improperly circumvented the word count limit, because the material in the exhibits is the factual support for the swear behind argument, not argument itself, and the amount of factual support is appropriate in the particular circumstances of this case, given the extent and degree of proof required to antedate, and that Patent Owner bears the burden of proof. *See Apator Miitors*, 887 F. 3d at 1297.

5. Conclusion Regarding Antedating

Because we conclude the Patent Owner has established a date of invention that removes Rashed and Lu as prior art, and all grounds require Rashed, we find that Petitioner has not shown by a preponderance of the evidence that claims 1, 2, 4, 8, 12, 13, 15-18, and 20 were unpatentable.

D. Patentability of Claims 3, 9, 10, 14, and 19

Petitioner argues that dependent claims 3, 9, 14, and 19 were anticipated by Rashed, and that claim 10 was obvious in view of Rashed and Nauta.[7] *See* Pet. 37-38, 44-46, 49-51, 56-57, 67-74.

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[7] The Petition also argued that "[t]o the extent that the Patent Owner challenges the anticipation …. by Rashed because, for instance, Patent Owner considers Rashed's first metal layer M1 not to be the lower-most metal layer …, it would have been obvi-

To establish anticipation, each and every element in a claim, arranged as recited in the claim, must be found in a single prior art reference. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1371 (Fed. Cir. 2008). Although the elements must be arranged or combined in the same way as in the claim, "the reference need not satisfy an *ipsissimis verbis* test," i.e., the terminology used need not be identical. *In re Gleave*, 560 F.3d 1331, 1334 (Fed. Cir. 2009) (citing *In re Bond*, 910 F.2d 831, 832-33 (Fed. Cir. 1990)). The dispositive question thus is whether one of ordinary skill in the art would reasonably have understood or inferred from a prior art reference that every claim element is disclosed in that reference. *Eli Lilly v. Los Angeles Biomedical Research Inst. at Harbor-UCLA Med. Ctr.*, 849 F.3d 1073, 1074-75 (Fed. Cir. 2017).

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 the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) any secondary consid-

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ous to APOSITA that Rashed teaches or suggests a first metal layer M1 that is the lower-most metal layer." Pet. 57. Because Patent Owner does not argue that Rashed's first metal layer M1 is not the lower-most metal layer, we need not address obviousness in view of Rashed alone.

erations, if in evidence.[8] *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966).

1. The Independent Claims

Because claims 3, 9, and 10 depend, ultimately, from claim 1, and claim 14 depends ultimately from claim 12, we first discuss independent claim 1 and independent claim 12, which the parties argue together, in the context of claim 1. We discuss claim 17, which is in means-plus-function format, separately in the discussion of its dependent claim 19.

a. "[a] circuit comprising"

Petitioner argues that "[t]o the extent … the preamble of claim 1 may be limiting, Rashed discloses 'a circuit.'" Pet. 19 (citing Ex. 1003 ¶ 52). We agree that Rashed discloses "a circuit," and Patent Owner does not argue otherwise.

b. "a first gate layer arranged according to a gate layer pitch between a second gate layer and a third gate layer"; "a first gate-directed local interconnect arranged between the first gate layer and the second gate layer"; and "a second gate-directed local interconnect arranged between the first gate layer and the third gate layer"

Regarding the gate layers and gate directed local interconnects, Petitioner cites, for example, the structure depicted in Rashed's Figure 4A, which we annotate with colors below left, next to Figure 4A of the

[8] Patent Owner does not present any objective evidence of nonobviousness (i.e., secondary considerations) as to any of the challenged claims.

'418 patent, with corresponding structures annotated with like colors:

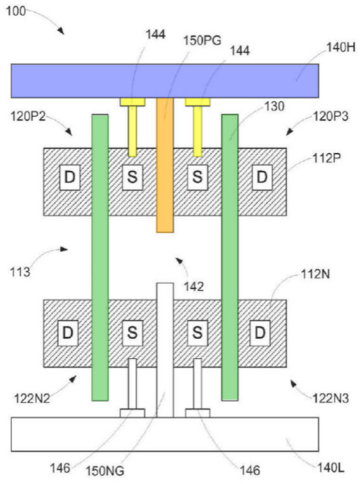

Figure 4A

Figure 4A of Rashed is a schematic depiction of an exemplary semiconductor device. See Ex. 1001, 3:29-31.

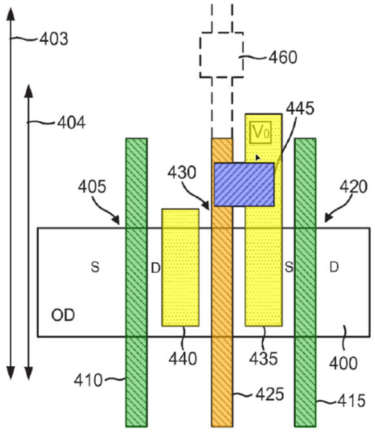

FIG. 4A

Figure 4A of the '418 patent shows "the layout for a pair of transistors in a continuous diffusion region including a blocking transistor." Ex. 1001, 3:9-10.

Petitioner asserts that in Rashed the first "gate layer" would be the structure in orange, the second and third gate layers would be the structures in green, and the first and second gate directed interconnects would be the structures in yellow. *See* Pet. 20-27. The first gate layer (in orange) is evenly spaced between the second and third gate layers (in yellow) and, thus, is "arranged according to a gate layer pitch between a second gate layer and a third gate layer." Patent Owner does not dispute that the structures highlighted

above correspond to the claimed gate layers and gate directed local interconnects (*see* PO Resp. 49-61), and we conclude that Petitioner has shown that Rashed describes these claim elements.

c. "a diffusion-directed local interconnect layer configured to couple the first gate layer to one of the first and second gate-directed local interconnects"

The purple bar shown in our annotated Figure 4A of Rashed is the structure Petitioner identifies as the "diffusion-directed local interconnect layer" that is "configured to couple the first gate layer to one of the first and second gate-directed local interconnects." *See* Pet. 28-29.

According to the reference, "[t]he isolating electrode[] 150PG"—which is the [orange] first gate layer—is "conductively coupled to the [purple] power rails 140H, 140L, respectively, by any of a variety of different conductive structures that are formed in a layer of insulating material positioned above the substrate." Ex. 1005, 5:44-48. The reference also explains that "the source regions of the PFET devices 120P2-3 are coupled to the [purple] power rail 140H by schematically depicted conductive structures 144"—which are the [yellow] gate directed interconnects." *Id.* at 6:32-34.

Patent Owner argues that "it is not enough for Petitioner to show 'power rail' 140H or 140L … can be interpreted as indirectly or incidentally coupling 'isolating electrode' 150PG or 150NG … to conductive structure 190P or 190N" because "the phrase 'configured to' in this element 'requir[es] structure designed to or configured to accomplish the specified objective, not simp-

ly that they can be made to serve that purpose.'" PO Resp. 56-57.

This argument is not persuasive because we find that Rashed's power rail is configured (or designed) to electrically couple the isolating electrodes to the conductive structures. Patent Owner's argument that "[t]he power rail of Rashed is physically constructed for the purpose of providing a source of power (e.g., Vdd or ground) to various components" (PO Resp. 57) is unavailing because, as constructed to provide power to both structures, the power rail *also* electrically couples them. *See* Tr. 10-11 (Patent Owner: "I don't dispute that they're all at the same potential."). It does not matter that "Rashed never states or suggests that these power rails are configured to couple those different components to one another" (PO Resp. 50) because the power rails are, in fact, designed to couple the components together.

Patent Owner also argues that the claim language is "not met simply if a first gate layer is coupled to one of the first and second gate-directed local interconnects" because the claim "requires that the structure or structures that couple those two elements be a diffusion-directed local interconnect layer." PO Resp. 58. Patent Owner argues Petitioner "affirmatively states" that "the power rails 140L and 140H are 'conductively coupled' to the isolating electrodes 150PG and 150NG … through conductive contacts" 192P and 192N and that "Petitioner does not assert that the 'diffusion-directed local interconnect layer' is the combination of a power rail and conductive contact." *Id.*

We are not persuaded by this argument because it is not commensurate with the scope of claim 1, which does not recite that the coupling is direct or not reliant

on other structures. As Patent Owner has not asked for a claim construction that would limit the claims to direct coupling, we interpret this open-ended claim, as we did at institution, to encompass a diffusion-directed local interconnect that couples the electrodes either directly or through other structures.[9] The power rail is "configured to couple" the gate layer and interconnect because it is part of a conductive path between those structures. If it were not present, for example, then the gate layer and interconnect would not be coupled together. Because it is present, they are coupled.

Further, at oral argument, Patent Owner confirmed that it "do[es] not assert a construction of 'coupled' to require direct coupling" (Tr. 17:18) and we see no material difference between an argument that the coupling does not have to be direct and the argument that the prior art does not describe coupling due to the presence of the conductive contacts.

We thus agree with Petitioner that Rashed discloses a diffusion-directed local interconnect layer configured to couple the first gate layer to one of the first and second gate-directed local interconnects.

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[9] *Cf. Asetek Holdings, Inc. v. Coolit Sys.*, No: C-12-4498, 2013 U.S. Dist. LEXIS 170488, at *17 (N.D. Cal. 2013) ("the term 'coupled'—in isolation—could support either direct or indirect connections"); *Silicon Image, Inc. v. Genesis Microchip, Inc.*, No. 3:01-c-266, 2002 U.S. Dist. LEXIS 28916, at *88 (E.D. Va. 2002) (observing that the "common usage of the term 'couple' supports both direct and indirect connections"); *Silicon Graphics, Inc. v. Nvidia Corp.*, 58 F.Supp.2d 331, 346 (D. Del. 1999) (noting that "the ordinary and accustomed meaning of the term 'couple,' even when used in an electronics context does not solely mean 'directly coupled'").

d. "wherein the first gate-directed local interconnect, the second gate-directed local interconnect, and the diffusion-directed local interconnect are all located between a lower-most metal layer and a semiconductor substrate for the circuit"

For this limitation, Petitioner points to cross-sectional Figures 5A-A, 6A, and 6B, contending that the interconnects are located between a lowermost metal layer ("metal 1 layer 179") and a substrate (113, 112P, or 112N). *See* Pet. 30-33. Patent Owner does not dispute that the structures identified by Petitioner as the interconnects lie between a lowest metal layer and a substrate. We conclude that Petitioner has shown that Rashed describes this arrangement.

2. Claim 3

Claim 3, which depends from claim 1, recites that "the diffusion-directed local interconnect layer is positioned outside of a footprint for the continuous diffusion region."

Petitioner argues that "power rails 140H, 140L are diffusion-directed interconnects" and that "as depicted in [Figures 4A, 4B, and 5A], power rails 140H, 140L are positioned outside the footprint of regions 112P and 112N." Pet. 37.

Patent Owner does not offer arguments specific to claim 3 (*see* PO Resp. 49-77), and we agree with Petitioner that the power rails in Rashed are outside the footprint of the continuous diffusion region.

3. Claim 9

Claim 8 recites that "the first gate layer is the gate layer for a diode-connected transistor." Claim 9, which depends from claim 8, recites "a continuous diffusion

region including drain/source terminals for the diode-connected transistor, and wherein the diffusion-directed local interconnect is located outside of a footprint for the continuous diffusion region."

Petitioner argues for claim 8 that "[a]t least because [Rashed's] isolating electrode 150PG is a gate layer for a diode-connected transistor and isolating electrode 150NG is a gate layer for another diode-connected transistor, Rashed discloses 'the first gate layer is the gate layer for a diode-connected transistor.'" Pet. 44 (citing Ex. 1003 (Liu Decl.) ¶ 86). For claim 9, Petitioner argues that "Rashed discloses 'a continuous diffusion region including drain/source terminals for the diode-connected transistor'" because "active region 112P includes drain/source terminals for a diode-connected transistor, and active region 112N includes drain/source terminals for another diode-connected transistor." *Id.* at 45 (citing Ex. 1003 (Liu Decl.) ¶ 86).

Patent Owner does not offer arguments specific to claim 9 (*see* PO Resp. 49-77), and we agree with Petitioner that Rashed discloses the features of claim 9.

4. Claim 10

Claim 10, which depends from claim 1, recites that "the first gate layer is a gate layer for a first inverter, and wherein the one of the first and second gate-directed local interconnects is a gate-directed local interconnect for an output node for a second inverter."

Petitioner argues that "the common-mode voltage inverter in Nauta has the gates and drains of the respective PFET and NFET of the inverter tied to each other" and that one of skill in the art would have been

motivated to add such an arrangement to Rashed for "various reasons" described in Nauta. *See* Pet. 68-73.

Patent Owner does not offer arguments specific to claim 10 (*see* PO Resp. 49-77), and we agree with Petitioner that the combination includes the features of claim 10 and that one of skill in the art would have been motivated to make the combination. *See* Ex. 1003 (Liu Decl.) ¶¶ 96-101.

5. Claim 14

Claim 13 depends from independent claim 12 and recites that "forming the first gate layer forms a gate for a blocking transistor." Claim 14 depends from claim 13 and adds "forming a continuous diffusion region," where "forming the first gate layer forms a gate for a transistor having a pair of drain/source terminals in the continuous diffusion region" and "forming the diffusion-directed local interconnect comprises forming [it] outside of a footprint for the continuous diffusion region."

For claim 13, Petitioner refers to its arguments for claim 1. *See* Pet. 49. For claim 14, Petitioner argues that Rashed's "isolating electrode 150PG is a gate layer for a blocking transistor formed respectively in diffusion region 112P" and refers to its analysis of claim 3 for the recitation "forming the diffusion-directed local interconnect outside of a footprint for the continuous diffusion region." *See* Pet. 50-51.

Patent Owner does not offer arguments specific to claim 14, but does argue with respect to claim 12 that "forming … to" requires "structure designed to or configured to accomplish the specified objective, not simply that they can be made to serve that purpose." PO Resp. 59. Patent Owner also argues that claim 12 "requires that the structure or structures that couple the

first gate layer to one of the first and second gate-directed local interconnects be [a] diffusion-directed local interconnect layer." Prelim. Resp. 60.

Patent Owner's arguments mirror those made in connection with claim 1, and we find them unpersuasive for the same reasons articulated in Section II.D.1.c.

6. Claim 19

Independent claim 17 is similar to claims 1 and 12, but is written in means plus function format. Patent Owner argues that "the corresponding structures of [the "means for coupling"] element … are the diffusion-directed local interconnects described in the '418 Patent" and that "[n]one of [those] the diffusion-directed local interconnects … rely upon other structures, for example, an intermediate connection such as a 'via' (or contact hole), to couple to either a gate-directed local interconnect or gate layer." PO Resp. 60-61. Petitioner's Reply does not address this issue.

We agree with Patent Owner that Petitioner has not shown how Rashed describes the claimed "means-for-coupling." As Patent Owner argues, none of the identified structures in the '418 patent rely on additional structures for the coupling, and Petitioner has not argued that Rashed's arrangement, which does rely on an intermediate structure, would be an equivalent to the disclosed structures.

We accordingly conclude that Petitioner has not shown that claim 17 is anticipated by Rashed and, because claim 17 has not been shown to be anticipated, claim 19, which depends from and includes all of the limitations of claim 17, has not been shown to be anticipated either.

7. Conclusion on the Patentability of Claims 3, 9, 10, 14, and 19

For the reasons above, we conclude that Petitioner has shown by a preponderance of the evidence that claims 3, 9, 10, and 14 of the '418 patent are unpatentable. Petitioner has not shown that claim 19 of the '418 patent is unpatentable.

E. Motions to Seal

At the time it filed its Response, Patent Owner moved to seal "Exhibits 2005-2007, 2009, 2010, 2011A-2011C, 2012, 2014A-2014C, 2015, 2016A, 2016C, 2017-2021, 2022A, 2022B, 2023-2026, 2027A, 2027B, 2028A, 2028B, 2029-2032, 2034-2041, 2043-2052, 2053A-2053C, 2054, 2055, 2056A, 2056B, 2057, 2058, and 2060-2063." Paper 19 ("PO Mot. to Seal") 1. At the time it filed its Reply, Petitioner filed a motion to "seal its Petitioner Reply and supporting Exhibits APPLE-1015 through 1019." Paper 34 ("Pet. Mot. to Seal") 1. Neither motion is opposed.

All papers are available for public access by default. *See* 35 U.S.C. § 316(a)(1). A party may file a motion to seal concurrent with the filing of the confidential information at issue, and the information is sealed pending the motion's outcome. 37 C.F.R. § 42.54. Commercial information may be confidential information. *See* 37 C.F.R. § 42.54(7).

The standard for granting a motion to seal is "good cause." 37 C.F.R. § 42.54(a). For instance, we consider whether the movant has adequately shown that "(1) the information sought to be sealed is truly confidential, (2) a concrete harm would result upon public disclosure, (3) there exists a genuine need to rely in the trial on the specific information sought to be sealed, and (4) on bal-

ance, an interest in maintaining confidentiality outweighs the strong public interest in having an open record." *Argentum Pharms. LLC v. Alcon Research, Ltd.*, IPR2017-01053, Paper 27 at 4 (PTAB Jan. 19, 2018) (informative).

Patent Owner argues there is good cause for sealing the exhibits because "Patent Owner is swearing behind certain prior art relied upon in the Petition" and the exhibits to support that argument "consist of and are permeated with commercially-sensitive information that is still used in it[s] products today, and for certain of which Patent Owner owes a duty of confidentiality to third party Taiwan Semiconductor Manufacturing Company ('TSMC')." *See* PO Mot. to Seal 3-6. Patent Owner also argues that "[t]he public's interest in maintaining a complete and understandable record in this proceeding is not harmed by maintaining the Confidential Documents under seal" because "Patent Owner's Response and Dr. Lall's declaration, each of which are public, provide summaries of relied-upon portions of the Confidential Documents" and the Board's "reliance on the Confidential Documents does not necessitate the full disclosure to the public of the Confidential Documents." *Id.* at 7.

Petitioner states that it is "not in a position to make the necessary representations about why [its filings] may warrant sealing," but that "because [they discuss] material filed by Patent Owner under seal, Petitioner has filed its Petitioner Reply and the supporting evidence under seal." Pet. Mot. to Seal 2.

Based on the parties' representations, we conclude that the papers proposed to be sealed include commercially-sensitive information that is not publicly available, that the information sought to be sealed reflects

confidential business information of Patent Owner and/or TSMC, and that "an interest in maintaining confidentiality outweighs the strong public interest in having an open record" here. *See Argentum*, Paper 27 at 4. We thus determine that good cause exists for sealing and grant the Motions to Seal.

Patent Owner also submits, as Appendix A to its motion, "[a] copy of the Board's Default Protective Order, as modified by agreement among Patent Owner and Petitioner." PO Mot. to Seal 2. The proposed modifications add an attorney's eyes only tier and provisions that govern the exchange of documents and information among the parties. *See* PO Mot. to Seal, Appendix B.

Patent Owner asserts that "[g]ood cause exists for the modifications because the Confidential Documents consist of and are permeated with confidential and highly-sensitive business and technical information of Patent Owner and third-party Taiwan Semiconductor Manufacturing Company ('TSMC') that, if shared with Petitioner's in-house counsel and business personnel, would harm TSMC's and Patent Owner's respective businesses" and "because the circuit layout (GDS) Patent Owner relies upon is too large to upload to E2E and too sensitive to transmit electronically, necessitating special procedures to make it available for inspection by Petitioner." PO Mot. to Seal 2-3.

We conclude that the modifications to the default order are appropriate under the circumstances and thus enter the proposed protective order attached as Appendix A to Patent Owner's motion. Nothing in that order shall, however, impose any obligation on the Board or any Office employee that does not already exist under our rules and the default protective order.

The parties are reminded that **confidential information subject to a protective order ordinarily becomes public 45 days after a final judgment in a trial**. *See* Patent Trial and Appeal Board Consolidated Trial Practice Guide (November 2019) 19-22.[10] To avoid that, a party may file a motion to expunge confidential information from the record before the information becomes public. *See* 37 C.F.R. § 42.56.

III. CONCLUSION

Claims 1, 2, 4, 5, 8, 12, 13, 15-19, and 20 have not been shown to be unpatentable. Claims 3, 9, 10, and 14 have been shown to be unpatentable. The results are summarized below.

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1-3, 5, 8, 9, 12-14, 16-19	102	Rashed	3, 9, 14	1, 2, 4, 5, 8, 12, 13, 15-19, 20
1-3, 5, 8, 9, 12-14, 16-19	103	Rashed	N/A	N/A
4, 15, 20	103	Rashed, Lu		4, 15, 20
10	103	Rashed, Nauta	10	
Overall Outcome			3, 9, 10, 14	1, 2, 4, 5, 8, 12, 13, 15-19, 20

[10] Available at <https://www.uspto.gov/patents-application-process/patenttrial-and-appeal-board/trials/guidance>.

IV. ORDER

For the reasons given, it is:

ORDERED that claims 3, 9, 10, and 14 of U.S. Patent 9,024,418 B2 are unpatentable;

ORDERED that claims 1, 2, 4, 5, 8, 12, 13, 15-19, and 20 of U.S. Patent 9,024,418 B2 have not been shown to be unpatentable;

ORDERED that Patent Owner's Motion to Seal and Petitioner's Motion to Seal are *granted* and the Protective Order attached as Appendix A to Paper 19 is *entered*; and

FURTHER ORDERED that, because this is a Final Written Decision, the parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.[11]

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[11] 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. 16654 (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).

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APPENDIX F

UNITED STATES COURT OF APPEALS
FOR THE FEDERAL CIRCUIT

2020-1683, 2020-1763, 2020-1764, 2020-1827

APPLE INC.,

Appellant,

v.

QUALCOMM INCORPORATED,

Appellee.

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2018-01276, IPR2018-01281, IPR2018-01282, IPR2018-01460.

Filed November 10, 2021

JUDGMENT

THIS CAUSE having been considered, it is

ORDERED AND ADJUDGED:

DISMISSED

ENTERED BY ORDER OF THE COURT

November 10, 2021

/s/ Peter R. Marksteiner
Peter R. Marksteiner
Clerk of Court

APPENDIX G

RELEVANT CONSTITUTIONAL AND STATUTORY PROVISIONS

U.S. Const. art. III

SECTION 1. The judicial Power of the United States, shall be vested in one supreme Court, and in such inferior Courts as the Congress may from time to time ordain and establish. The Judges, both of the supreme and inferior Courts, shall hold their Offices during good Behaviour, and shall, at stated Times, receive for their Services, a Compensation, which shall not be diminished during their Continuance in Office.

SECTION 2. The Judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made, or which shall be made, under their Authority;—to all Cases affecting Ambassadors, other public Ministers and Consuls;—to all Cases of admiralty and maritime Jurisdiction; to Controversies to which the United States shall be a Party;—to Controversies between two or more States; between a State and Citizens of another State; between Citizens of different States,—between Citizens of the same State claiming Land under Grants of different States, and between a State, or the Citizens thereof, and foreign States, Citizens or Subjects.

In all Cases affecting Ambassadors, other public Ministers and Consuls, and those in which a State shall be Party, the supreme Court shall have original Jurisdiction. In all the other Cases before mentioned, the supreme Court shall have appellate Jurisdiction, both

as to Law and Fact, with such Exceptions, and under such Regulations as the Congress shall make.

The Trial of all Crimes, except in Cases of Impeachment, shall be by Jury; and such Trial shall be held in the State where the said Crimes shall have been committed; but when not committed within any State, the Trial shall be at such Place or Places as the Congress may by Law have directed.

SECTION 3. Treason against the United States, shall consist only in levying War against them, or in adhering to their Enemies, giving them Aid and Comfort. No Person shall be convicted of Treason unless on the Testimony of two Witnesses to the same overt Act, or on Confession in open Court.

The Congress shall have Power to declare the Punishment of Treason, but no Attainder of Treason shall work Corruption of Blood, or Forfeiture except during the Life of the Person Attainted.

28 U.S.C. § 1295(a)(1), (4)

§1295. Jurisdiction of the United States Court of Appeals for the Federal Circuit

(a) The United States Court of Appeals for the Federal Circuit shall have exclusive jurisdiction—

(1) of an appeal from a final decision of a district court of the United States, the District Court of Guam, the District Court of the Virgin Islands, or the District Court of the Northern Mariana Islands, in any civil action arising under, or in any civil action in which a party has asserted a compulsory counterclaim arising under, any Act of Congress relating to patents or plant variety protection;

* * *

(4) of an appeal from a decision of—

(A) the Patent Trial and Appeal Board of the United States Patent and Trademark Office with respect to a patent application, derivation proceeding, reexamination, post-grant review, or inter partes review under title 35, at the instance of a party who exercised that party's right to participate in the applicable proceeding before or appeal to the Board, except that an applicant or a party to a derivation proceeding may also have remedy by civil action pursuant to section 145 or 146 of title 35; an appeal under this subparagraph of a decision of the Board with respect to an application or derivation proceeding shall waive the right of such applicant or party to proceed under section 145 or 146 of title 35;

(B) the Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office or the Trademark Trial and Appeal Board with respect to applications for registration of marks and other proceedings as provided in section 21 of the Trademark Act of 1946 (15 U.S.C. 1071); or

(C) a district court to which a case was directed pursuant to section 145, 146, or 154(b) of title 35;

* * *

35 U.S.C. § 141

§141. Appeal to Court of Appeals for the Federal Circuit

(a) EXAMINATIONS.—An applicant who is dissatisfied with the final decision in an appeal to the Patent Trial and Appeal Board under section 134(a) may appeal the Board's decision to the United States Court of Appeals for the Federal Circuit. By filing such an appeal, the applicant waives his or her right to proceed under section 145.

(b) REEXAMINATIONS.—A patent owner who is dissatisfied with the final decision in an appeal of a reexamination to the Patent Trial and Appeal Board under section 134(b) may appeal the Board's decision only to the United States Court of Appeals for the Federal Circuit.

(c) POST-GRANT AND INTER PARTES REVIEWS.—A party to an inter partes review or a post-grant review who is dissatisfied with the final written decision of the Patent Trial and Appeal Board under section 318(a) or 328(a) (as the case may be) may appeal the Board's decision only to the United States Court of Appeals for the Federal Circuit.

(d) DERIVATION PROCEEDINGS.—A party to a derivation proceeding who is dissatisfied with the final decision of the Patent Trial and Appeal Board in the proceeding may appeal the decision to the United States Court of Appeals for the Federal Circuit, but such appeal shall be dismissed if any adverse party to such derivation proceeding, within 20 days after the appellant has filed notice of appeal in accordance with section 142, files notice with the Director that the party elects to have all further proceedings conducted as provided in

section 146. If the appellant does not, within 30 days after the filing of such notice by the adverse party, file a civil action under section 146, the Board's decision shall govern the further proceedings in the case.

35 U.S.C. § 315(e)

§315. Relation to other proceedings or actions

* * *

(e) ESTOPPEL.—

(1) PROCEEDINGS BEFORE THE OFFICE.—The petitioner in an inter partes review of a claim in a patent under this chapter that results in a final written decision under section 318(a), or the real party in interest or privy of the petitioner, may not request or maintain a proceeding before the Office with respect to that claim on any ground that the petitioner raised or reasonably could have raised during that inter partes review.

(2) CIVIL ACTIONS AND OTHER PROCEEDINGS.—The petitioner in an inter partes review of a claim in a patent under this chapter that results in a final written decision under section 318(a), or the real party in interest or privy of the petitioner, may not assert either in a civil action arising in whole or in part under section 1338 of title 28 or in a proceeding before the International Trade Commission under section 337 of the Tariff Act of 1930 that the claim is invalid on any ground that the petitioner raised or reasonably could have raised during that inter partes review.

* * *

35 U.S.C. § 319

§319. Appeal

A party dissatisfied with the final written decision of the Patent Trial and Appeal Board under section 318(a) may appeal the decision pursuant to sections 141 through 144. Any party to the inter partes review shall have the right to be a party to the appeal.