Trials@uspto.gov
571-272-7822

Paper 23
Date: October 26, 2023

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TELEFONAKTIEBOLAGET LM ERICSSON AND ERICSSON INC.,
and AT&T SERVICES, INC.,
Petitioner,

v.

K.MIZRA LLC,
Patent Owner.

IPR2022-00730
Patent 8,958,819 B2

Before NATHAN A. ENGELS, AARON W. MOORE, and IFTIKHAR AHMED, *Administrative Patent Judges*.

AHMED, *Administrative Patent Judge*.

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

I. INTRODUCTION

Telefonaktiebolaget LM Ericsson, Ericsson Inc., and AT&T Services, Inc. (collectively, "Petitioner") requested an *inter partes* review of claims 22, 23, 30, 32, and 33 (the "challenged claims") of U.S. Patent 8,958,819 B2 (Ex. 1001, "the '819 patent"). Paper 3 ("Petition" or "Pet."). K.Mizra LLC ("Patent Owner") filed a Preliminary Response. Paper 9. Applying the standard set forth in 35 U.S.C. § 314(a), we instituted an *inter partes* review of the challenged claims. Paper 11 ("Inst. Dec.").

After institution, Patent Owner filed a Patent Owner Response (Paper 13, "PO Resp."), Petitioner filed a Reply to Patent Owner's Response (Paper 14, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 17, "PO Sur-reply"). An oral hearing was held on July 27, 2003, and a copy of the transcript was entered in the record. Paper 22 ("Tr.").

We have jurisdiction pursuant to 35 U.S.C. § 6. This Decision is a Final Written Decision under 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73 as to the patentability of the claims on which we instituted trial. To prevail, Petitioner must prove unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (2018); 37 C.F.R. § 42.1(d) (2020). Having reviewed the arguments and the supporting evidence, we determine that Petitioner has not demonstrated, by a preponderance of the evidence, that the challenged claims are unpatentable.

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies "Telefonaktiebolaget LM Ericsson and Ericsson Inc. as well as AT&T Services, Inc." as the real parties-in-interest. Pet. 70. Patent Owner identifies itself as the real party-in-interest. Paper 4, 1.

B. Related Proceedings

According to the parties, the '819 patent is asserted in the following litigations in the District Court of the Eastern District of Texas: *K.Mizra LLC v. AT&T Corp.*, No. 2:21-cv-00241-JRG; *K.Mizra LLC v. T-Mobile US, Inc.*, No. 2:21-cv-00242-JRG; and *K.Mizra LLC v. Verizon Wireless*, No. 2:21-cv-00243-JRG ("District Court litigation"). Pet. 70; Paper 4, 1.

C. The '819 Patent (Ex. 1001)

The '819 patent, titled "Femto-Assisted Location Estimation in Macro-Femto Heterogeneous Networks," was filed on June 21, 2013, and claims priority to a provisional application filed on December 11, 2012. Ex. 1001, codes (22), (54), (60).

The '819 patent concerns location estimation in a macro-femto heterogeneous network for wireless communications. *Id.* at code (57), 1:14–17, 1:42–47. More specifically, the '819 patent describes that global positioning system techniques generally do not provide reasonable location estimation accuracy for user equipment ("UE") position under non-line-of-sight conditions, especially in heavily obscured environments, such as indoor environments or those with many tall buildings. *Id.* at 1:31–36. To improve location determination services in such environments, the '819 patent describes a method that may be employed in a heterogeneous network ("HetNet"), which is a network that includes both macro base stations ("mBS") and femto base stations ("fBS"). *Id.* at 1:42–47. The method includes "receiving base station information related to a user equipment and receiving particle information for a first set of particles corresponding to possible user equipment locations," and "determining user equipment location information based on a first particle filtering technique for particle filtering the first set of particles based on the base station information." *Id.*

at 2:28–36. The '819 patent discloses that many factors can be employed in determining the location of user equipment, including range estimation and angle estimation. *Id.* at 3:65–4:1. The location determination may also employ particle filtering that "can determine a distribution, e.g., a posterior distribution, etc., of a latent variable at a time specified in a defined state space, e.g., a continuous state space." *Id.* at 4:24–33. The '819 patent also discloses that "[t]o evaluate a UE location in real time, a sequential Monte Carlo (MC) method, e.g., a particle filter can provide an approach for computing posterior distribution," which is "based on both prior knowledge and a likelihood function of an instantaneous observation." *Id.* at 5:46–52. The method can "combine a particle filter associated with the position belief information from a fBS with particle expressions to effectively utilize the information from the fBS in determining a location for a UE." *Id.* at 5:56–59.

Figure 6, reproduced below, is a diagram of a location-determining system as described in the '819 patent.

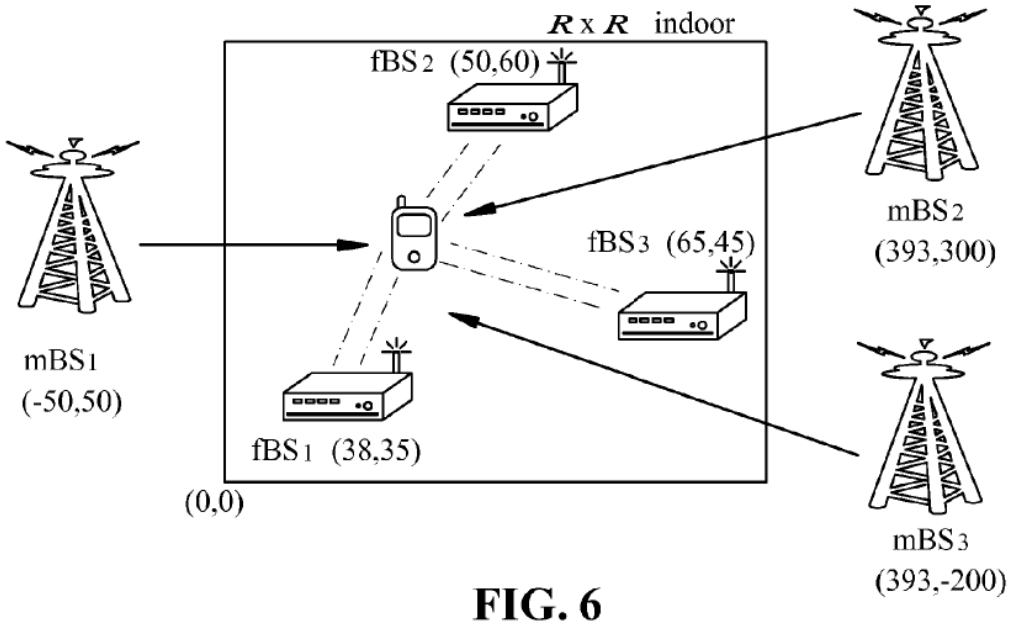


FIG. 6

Figure 6 shows a user equipment (cell phone) that can determine location using information from macro base stations (e.g., mBS_1, mBS_2, and mBS_3) and femto base stations (e.g., fBS_1, fBS_2, and fBS_3). *Id.* at 16:23–34.

D. Challenged Claims

Petitioner challenges claims 22, 23, 30, 32, and 33, of which claims 22 and 30 are independent claims. Claim 22 is reproduced below with italics added to highlight disputed claim language.

> 22. A computer-readable storage medium having computer-executable instructions that, in response to execution, cause a computing device including a processor to perform operations, comprising:
>
> receiving femto base station timing information related to a user equipment;
>
> receiving macro base station timing information related to the user equipment;
>
> receiving particle information for a first set of particles corresponding to possible user equipment locations;
>
> receiving femto base station position information; and
>
> *determining user equipment location information based on a first particle filtering applied to the first set of particles, the first particle filtering employing the femto base station timing information and the macro base station timing information*.

Ex. 1001, 33:45–60 (emphasis added).

Claim 30 is reproduced below with italics added to highlight disputed claim language.

> 30. A method, comprising:
>
> receiving femto base station timing information related to a user equipment;
>
> receiving macro base station timing information related to the user equipment;
>
> receiving particle information for a first set of particles corresponding to possible user equipment locations;
>
> receiving femto base station position information; and

> *determining user equipment location information based on a first particle filtering for particle filtering the first set of particles based on the base station information.*

Id. at 34:36–46 (emphasis added).

E. Prior Art and Instituted Grounds of Unpatentability

We instituted trial based on the following grounds of unpatentability:

Claims Challenged	35 U.S.C. §[1]	Reference(s)/Basis
22, 30	102	Pakzad[2]
22, 30	103	Pakzad
23, 32, 33	103	Pakzad, Ketchum[3]
32, 33	103	Pakzad, Ketchum, Klepal[4]

Inst. Dec. 38. Petitioner supports its arguments with declaration testimony of Dr. Nicholas Bambos. Exs. 1009, 1017; Pet. 3, 21–62. Patent Owner supports its arguments with declaration testimony of Dr. Douglas A. Chrissan. Ex. 2002.

[1] The Leahy-Smith America Invents Act ("AIA") included revisions to 35 U.S.C. §§ 102, 103 that became effective on March 16, 2013. Because the '819 patent claims the benefit of the priority date of U.S. Provisional Patent Application No. 61/735,875, which was filed before March 16, 2013, and neither party has argued that the provisions of the AIA apply, we apply the pre-AIA versions of the statutory bases for unpatentability. *See* Ex. 1001, codes (21), (22), (60); Pet. 14.
[2] U.S. Patent No. 8,594,701 B2, issued Nov. 26, 2013 (Ex. 1004, "Pakzad").
[3] U.S. Patent No. 8,600,297 B2, issued Dec. 3, 2013 (Ex. 1005, "Ketchum").
[4] U.S. Patent No. 9,217,788 B2, issued Dec. 22, 2015 (Ex. 1006, "Klepal").

III. ANALYSIS

A. Principles of Law

"In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable." *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify "with particularity . . . the evidence that supports the grounds for the challenge to each claim")). This burden of persuasion never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat'l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (discussing the burden of proof in *inter partes* review).

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. *See 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). 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); *accord In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990). Further, to be anticipating, a prior art reference must be enabling and must describe the claimed invention sufficiently to have placed it in possession of a person of ordinary skill in the field of the invention. *Helifix Ltd. v. Blok-Lok, Ltd.*, 208 F.3d 1339, 1346 (Fed. Cir. 2000); *In re Paulsen*, 30 F.3d 1475, 1479 (Fed. Cir. 1994).

As set forth in 35 U.S.C. § 103(a),

> [a] patent may not be obtained . . . 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.

The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.[5] *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966). An obviousness analysis "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007); *accord In re Translogic Tech., Inc.*, 504 F.3d 1249, 1259 (Fed. Cir. 2007). However, Petitioner cannot satisfy its burden of proving obviousness by employing "mere conclusory statements." *In re Magnum Oil Tools Int'l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016). Instead, Petitioner must articulate a reason why a person of ordinary skill in the art would have combined the prior art references. *In re NuVasive, Inc.*, 842 F.3d 1376, 1382 (Fed. Cir. 2016).

We analyze the asserted grounds of unpatentability in accordance with these principles to determine whether Petitioner has met its burden of establishing unpatentability of the challenged claims by a preponderance of the evidence.

[5] Neither party presents evidence of objective considerations of non-obviousness.

B. Level of Ordinary Skill in the Art

We review Petitioner's asserted obviousness grounds in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 17. Petitioner contends that a person of ordinary skill in the art "would have been someone with at least (1) a bachelor's degree in electrical engineering, computer engineering/science, or a related scientific field, and (2) either (a) a master's degree in electrical engineering, computer engineering/science, or a related filed, or (b) two or more years of work or research experience in wireless networking and/or computing." Pet. 21 (citing Ex. 1009 ¶ 23). Patent Owner does not dispute Petitioner's definition for a person of ordinary skill in the art, but adds that the person of ordinary skill in the art "may alternatively have additional years of practical and relevant work or research experience as substitution for less or different technical education, and vice versa." *See* PO Resp. 17.

We determine that the level of ordinary skill proposed by Petitioner is consistent with the '819 patent and the asserted prior art. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978). We adopt Petitioner's proposed level in deciding the patentability of the challenged claims.

C. Claim Construction

In this *inter partes* review, claims are construed using the same claim construction standard that would be used to construe the claims in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b) (2021). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims as understood by one of

ordinary skill in the art at the time of the invention. *See id.*; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc). In construing claims in accordance with their ordinary and customary meaning, we take into account the specification and prosecution history. *Phillips*, 415 F.3d at 1315–17.

1. "base station information" (claim 30)

Patent Owner contends "base station information" recited in the claim 30 should be construed "to refer to the previously recited 'femto base station timing information,' 'macro base station timing information,' *and* 'femto base station position information.'" PO Resp. 18. Patent Owner argues that its proposed construction is "based on at least three aspects of the intrinsic record: (1) the claim language itself; (2) guidance from the specification defining the disputed term; and (3) illustrative embodiments confirming the meaning of the disputed term." *Id.* (citing Ex. 2002 ¶ 47). Specifically, Patent Owner contends that "the specification describes two embodiments that further confirm to a [person of ordinary skill in the art] that 'the base station information' consists of the [three types of information previously] recited." *Id.* at 19–23 (citing Ex. 1001, 19:29–33, 20:50–54, Figs. 8, 9; Ex. 2002 ¶¶ 47–55).

Petitioner does not propose a construction for this term for the purposes of this proceeding. Pet. 17–20. Petitioner notes that it has argued in the District Court litigation that claim 30 is indefinite under 35 U.S.C. § 112 but those arguments are not presented to us. *Id.* at 15 n.3, 18 (citing *Samsung Elecs. Am., Inc. v. Prisua Eng'g Corp.*, 948 F.3d 1342, 1350–53 (Fed. Cir. 2020)). For the purposes of this proceeding, Petitioner adopts Patent Owner's proposed construction of the term. *See* Tr. 8:23–9:3.

Because Petitioner does not dispute the construction of the term "base station information" before us and Patent Owner's proposed construction is supported by intrinsic evidence, including the portions of the specification cited above, we adopt Patent Owner's proposed construction for the term. *See Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) ("The Board is required to construe 'only those 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)).

2. Remaining Claim Terms

We determine that it is not necessary to explicitly construe any other term or phrase for the purposes of this Decision, and we give all remaining claim terms their ordinary and customary meaning. *See Realtime Data*, 912 F.3d at 1375.

D. Overview of the Asserted Prior Art

1. Pakzad (Ex. 1004)

Pakzad discloses "methods, apparatuses, and systems for tracking a location of a mobile device based at least in part on measurements over time." Ex. 1004, code (57). Pakzad explains that "[m]obile devices can typically obtain a position fix by measuring ranges to three or more terrestrial transmitters (e.g., wireless access points) which are positioned at known locations," but that, in indoor environments, the precise location of the mobile device may be uncertain, considering constraints such as walls, stairways, and indoor paths. *Id.* at 1:16–51. Pakzad discloses that "a mobile device may employ a motion model such as a particle filter to incorporate direct and indirect measurements to estimate a motion state of the mobile device over a constrained routing graph." *Id.* at 3:32–35.

Figure 1 of Pakzad is reproduced below.

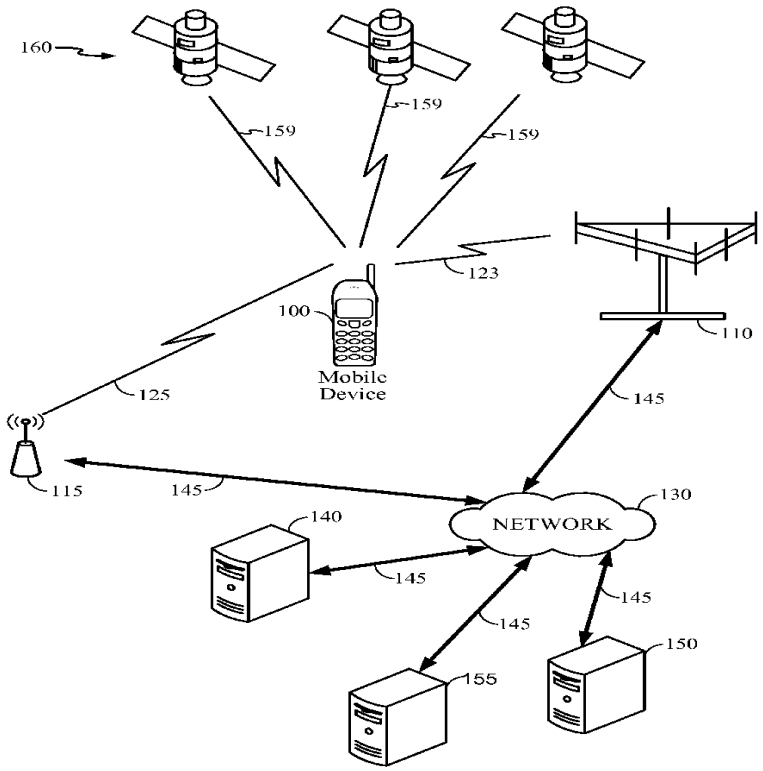


Figure 1 illustrates Pakzad's system, including mobile device 100, which may receive signals from satellites 160, base station transceiver 110, and local transceiver 115. *Id.* at 4:32–64. Pakzad explains that mobile device 100 may be able to compute a position fix or estimated location of the device based on measurements from four or more satellites 160. *Id.* at 5:13–21. Additionally, mobile device 100 may obtain a position fix by processing signals received from terrestrial transmitters fixed at known locations, such as base station transceiver 110, using one of several known techniques. *Id.* at 5:28–33. Pakzad explains that, in certain environments, such as indoor environments or urban canyons, "mobile device 100 may be capable of computing a position fix based at least in part on signals acquired from local transmitters (e.g., WLAN access points positioned at known locations)." *Id.* at 5:46–53.

Figure 4A of Pakzad is reproduced below.

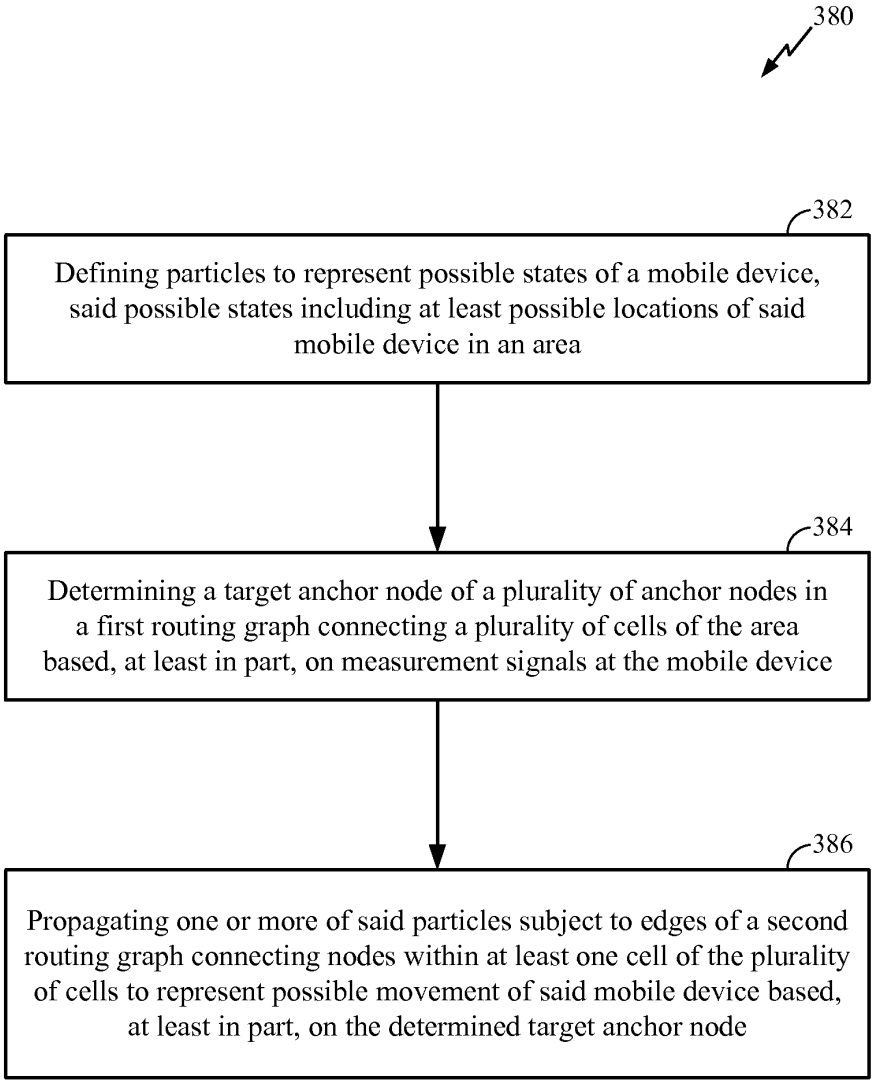


FIG. 4A

Figure 4A shows a flow diagram of a process disclosed in Pakzad to track a location of a mobile device. Ex. 1004, 2:3–4, 12:5–7.

Figure 4b of Pakzad is reproduced below.

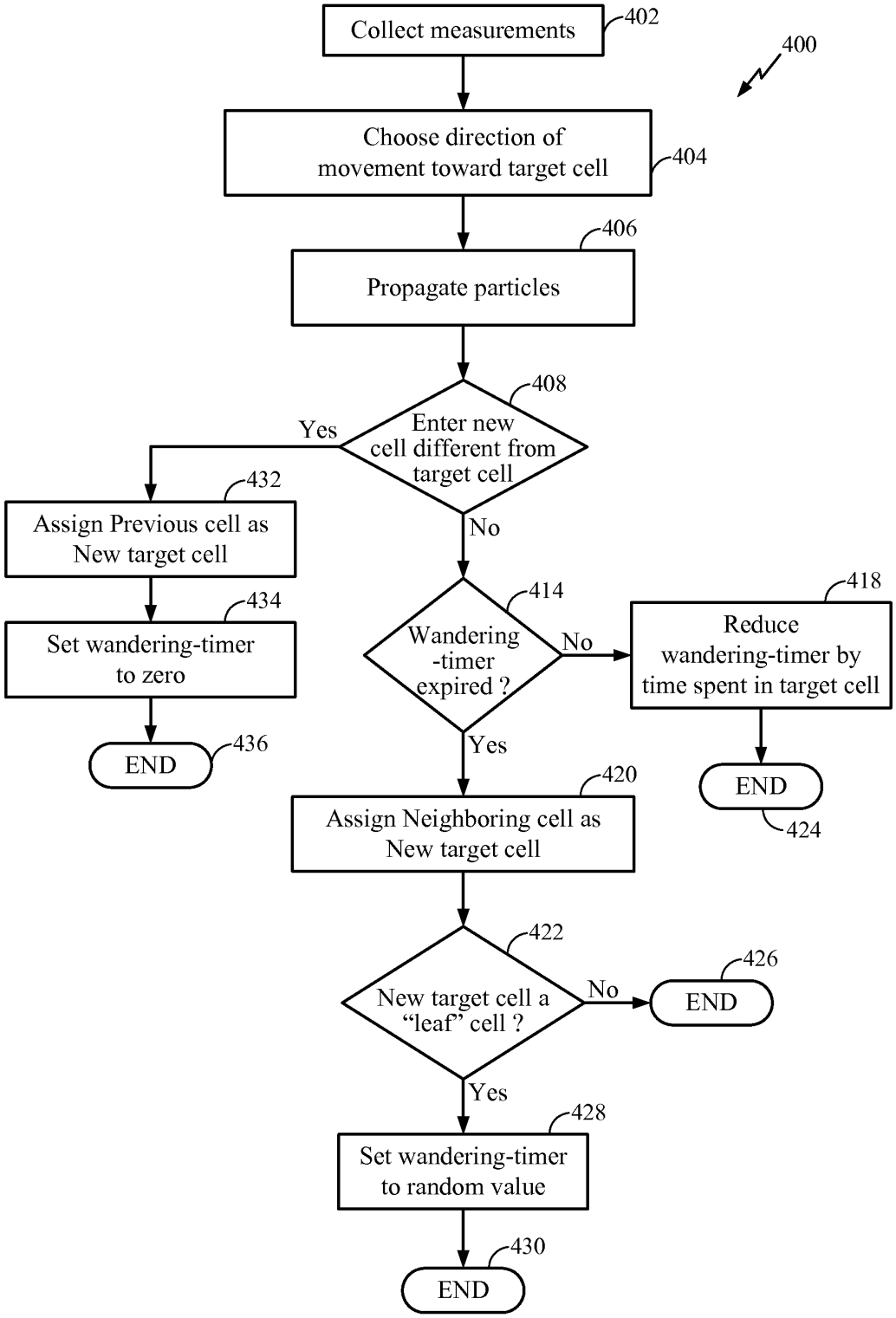


FIG. 4B

Figure 4B shows a flow diagram of a process disclosed in Pakzad to track a location of a mobile device. Ex. 1004, 2:5–6, 12:19–21. Pakzad discloses that "direct and/or indirect measurements indicative of a motion state of a mobile device may be collected from any one of several sources as discussed above and time referenced." *Id.* at 12:45–48. "[T]hese measurements may be considered in combination with prior particle movement or other form of particle filter history at block 404 to determine select or choose a target cell and/or a potential direction of movement toward the target cell." *Id.* at 12:48–52. "[A]n estimated or likely motion state of a mobile device may be determined based at least in part on particles propagated according to the motion model." *Id.* at 12:57–60.

2. Ketchum (Ex. 1005)

Ketchum discloses an access point ("AP") base station that is "self-timing and self-locating" using "Satellite Positioning System" and a second data source, such as a "cell site, terrestrial navigation station, server, user input interface, etc." Ex. 1005, code (57). Ketchum describes that "a new class of small base stations has emerged which may be installed in residential or business locations to provide indoor wireless coverage to mobile units using existing broadband internet connections," and that these "personal miniature base stations are generally known as an access point (AP) base station, also referred to as . . . femto cell [or] femto base station (fBS)." *Id.* at 1:18–29. Ketchum describes that "AP base stations generally need accurate time synchronization with the mobile operator's network as well as accurate frequency reference for generation of radio frequency carrier and sampling clocks," and that "AP base stations also need accurate information about their position . . . to support location-based services provided by cellular networks." *Id.* at 1:50–57. However, Ketchum

describes that obtaining time and location information in indoor residential and commercial environments can be complicated. *Id.* at 1:57–62. To overcome this shortcoming, Ketchum proposes using both signals from a plurality of satellites and data from a second source. *Id.* at 2:15–26.

Figure 5 of Ketchum is reproduced below.

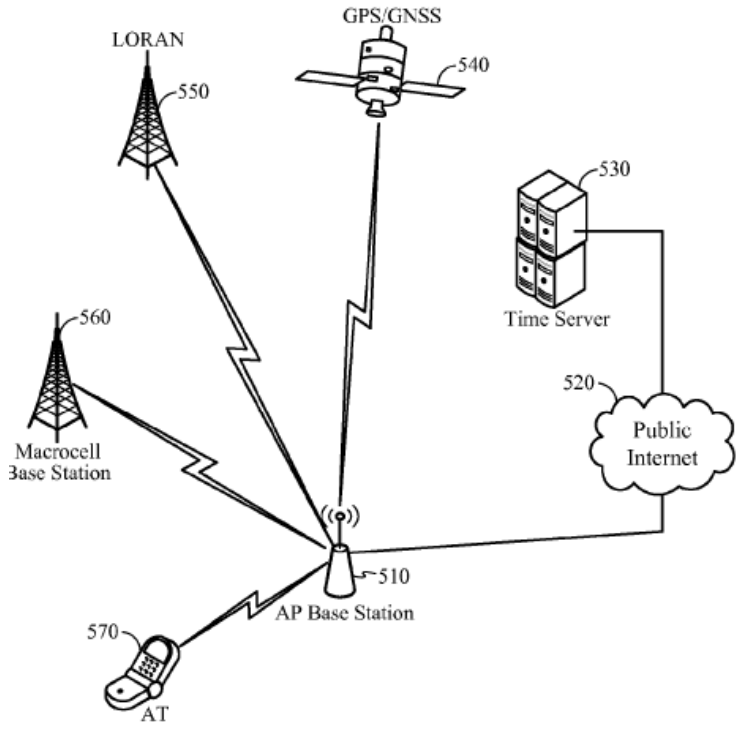


FIG. 5

Figure 5 illustrates AP base station 510 in Ketchum's system with a backhaul link to the public internet 520 and connected to time server 530, as well as various other positioning information sources, including positioning satellite 540, Long Range Aid to Navigation (LORAN) station 550, and macro base station 560, which the AP base station may utilize to determine its position. Ex. 1005, 11:3–19.

3. Klepal (Ex. 1006)

Klepal concerns location and tracking systems such as navigation systems used in large office buildings or for tracking location of security

personnel in an airport, and seeks to improve the ability to identify locations of mobile nodes. Ex. 1006, 1:10–29. Klepal discloses using "a particle filter algorithm to locate a mobile" device, "in which particles are mapped to the physical environment as represented by the physical environment model." *Id.* at 2:55–58. The particle filter algorithm employs sampling particles from a "transition distribution," and then calculates an "importance factor" for each particle. *Id.* at 12:1–7. Klepal discusses problems with certain implementations of the particle filter and suggests using "importance sampling," where particles are sampled from a related importance distribution. *Id.* at 12:17–26.

E. Anticipation based on Pakzad

Petitioner contends independent claims 22 and 30 are unpatentable as anticipated by Pakzad. Pet. 21–36. For the reasons that follow, we are not persuaded that Petitioner has established by a preponderance of the evidence that these claims are unpatentable under § 102 in view Pakzad.

1. Independent Claim 22

Patent Owner argues that Pakzad fails to disclose the "the first particle filtering employing the femto base station timing information *and* the macro base station timing information" limitation of independent claim 22. PO Resp. 27–39. We begin our discussion with the parties' arguments on this limitation.

a) *"determining user equipment location information based on a first particle filtering applied to the first set of particles, the first particle filtering employing the femto base station timing information and the macro base station timing information"*

(1) Petitioner's Contentions

Petitioner contends that "Pakzad discloses using *all possible types* of base station information (femto and macro base station timing information as well as 'femto base station position information')," and that Pakzad's "particle filter can use any measurements discussed in Pakzad to determine the location of the UE." Pet. 33–35 (citing Ex. 1004, 2:5–6, 12:5–7, 12:10–13, 12:45–48, claims 1, 25, 26, Figs. 4A, 4B; Ex. 1009 ¶ 66). Petitioner contends that Pakzad's particle filter discloses using timing information from macro and femto base stations as well as femto base station position information to update particles that determine the location of a UE. *Id.* at 35–36 (citing Ex. 1004, 13:26–50, 12:13–18; Pet. §§ VII.A.3, VII.A.5; Ex. 1009 ¶ 66).

(2) Patent Owner Response

Patent Owner responds that Pakzad lacks any disclosure of using both macro and femto base station information *together* to determine the location of a UE. PO Resp. 27, 31 (Ex. 2002 ¶¶ 66–70). Instead, Patent Owner contends, "Pakzad discloses using macro station information in one instance, *and only when the UE is out of range with respect to the macro base station*, then femto base station information may be used in the alternative—but, not concurrently." *Id.* at 31–39 (citing Ex. 1004, 5:28–53). Patent Owner further contends that "while Pakzad discloses various possible network implementations including three possible signal sources (macro base stations, local transceivers, and satellites), it uses the information related to

the local transceiver (e.g., femto base station) only when the other two are unavailable or out of range." *Id.* at 29–30 (citing Ex. 1004, 4:52–56; 12:45–52; Ex. 2002 ¶ 69).

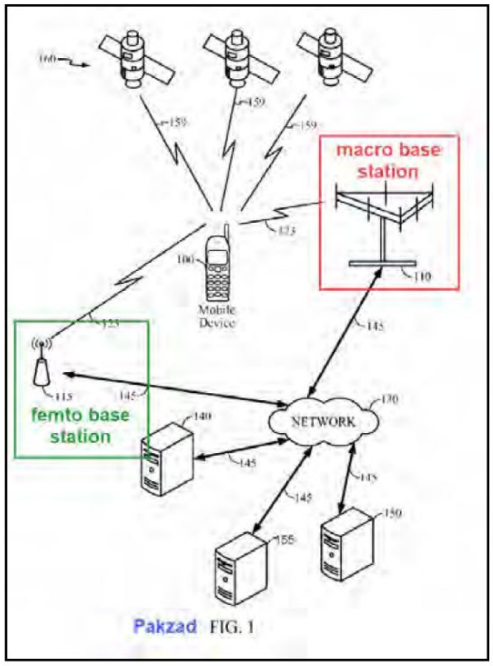
Patent Owner further contends that at Block 402 of Figure 4B, Pakzad "only collects measurements from one source or another—not multiple sources together, i.e., macro and femto base stations as required by the challenged claims." *Id.* at 34–35 (citing Ex. 2002 ¶¶ 68–70). Patent Owner argues that Dr. Bambos's opinions are unsubstantiated and conclusory, without citing to any evidence because his citations do not support his assertions. *Id.* at 36 (citing Ex. 1009 ¶¶ 65–67). Patent Owner contends that Pakzad discusses determining target anchor nodes based on measurement signals but is silent about applying a first particle filter. *Id.* (citing Ex. 1004, 12:10–13). Moreover, Patent Owner contends, Pakzad's use of "measurement signals" in general does not teach employing both femto and macro base station timing information together. *Id.* Patent Owner also argues that Pakzad "discusses *collecting* measurements rather than *employing* them." *Id.* at 37 (citing Ex. 1004, 12:45–48).

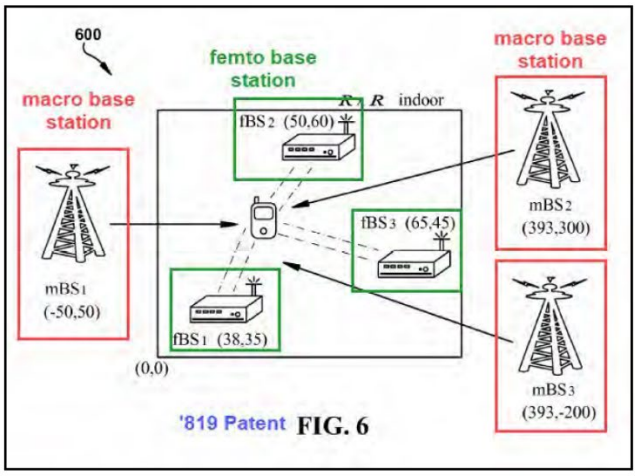
Patent Owner also argues Pakzad teaches the use of information from a single source *type*—e.g., use of femto base station information only when macro base stations or satellites are out of range. *Id.* (citing Ex. 1004, 3:32–50, 5:28–53, 12:13, 12:45–52, 4:52–56; Ex. 2002 ¶¶ 66–70). Lastly, Patent Owner argues that Pakzad is not enabling because, unlike the '819 patent, "Pakzad does not describe *how* to employ both femto and macro base station timing information together when applying the first particle filtering." *Id.* at 38–39 (citing Ex. 1001, 8:26–38; Ex. 2002 ¶¶ 65, 71).

(3) Petitioner's Reply

Petitioner responds that Patent Owner's argument incorrectly requires that the phrase "any one of" in Pakzad's disclosure means "one and only one" and that "sources" means "source types." Pet. Reply 2–3 (citing Ex. 1004, 12:45–48). Petitioner contends that Patent Owner's interpretation of Pakzad's disclosure "would require the particle filter to use information from one – and only one – individual base station or satellite source," and that "[s]uch an interpretation makes no sense in the context of location determination, which often relies on information from three or more sources to provide a useful location estimate." *Id.* at 3 (citing Ex. 1001, 21:13–18; Ex. 1004, 1:23–30; Ex. 1005, 13:45–48; Ex. 1017 ¶ 4).

Petitioner contends that Pakzad uses the term "sources," and not "source types," as argued by Patent Owner, but Petitioner argues that even under Patent Owner's interpretation, Pakzad discloses more than one source type. *Id.* at 4–5 (citing Ex. 1004, 12:45–48). Petitioner's annotated versions of Pakzad's Figure 1 alongside Figure 6 from the '819 patent are reproduced below.





Id. at 5. Petitioner contends that Pakzad's Figure 1 "is a system diagram illustrating certain features of a system containing a mobile device, in accordance with an implementation" and clearly shows the UE in communication (lines 123 and 125) with both femto (115) and macro (110) base stations at the same time. *Id.* (citing Ex. 1001, Fig. 6, Ex. 1004, 1:59–61, 4:52–64, 17:7–47, 20:14–16, Figs. 1, 6; Ex. 1009 ¶ 52; Pet. 22–26). According to Petitioner, Pakzad's Figure 1 is substantially the same as Figure 6 of the '819 patent, which Patent Owner contends teaches "concurrent utilization of both femto and macro base station information." *Id.* at 5–6 (citing PO Resp. 27–29).

According to Petitioner, "Pakzad teaches that the particle filter uses 'measurements' without restricting them to one 'source type.'" *Id.* at 6 (citing Ex. 1004, 12:10–13, 13:26–33). Petitioner argues that Pakzad's use of the word "measurements" is properly understood as referring to any type of measurement as opposed to limited to only one type of measurement. *Id.* Petitioner further contends that "[b]y ignoring macro base station

information, . . . Pakzad's particle filter would needlessly produce worse estimates of a UE's location than if the filter simply incorporated those macro base station measurements." *Id.* at 7 (citing Ex. 1009 ¶¶ 28–38; Ex. 1017 ¶¶ 5–6). Petitioner argues that if Pakzad was indeed limiting in that manner, "then Pakzad would expressly state that its invention is limited to using only femto base station timing information." *Id.* at 8.

Petitioner further contends that Patent Owner relies on Pakzad's use of the word "alternatively" as limiting the type of information used by Pakzad, but according to Petitioner, that embodiment "merely describes a scenario when the UE will calculate its location 'at least in part' on information from 'local transmitters,' which include femto base stations." Pet. Reply 8–9 (citing Ex. 1004, 4:52–64, 5:46–53; PO Resp. 32–33). According to Petitioner, "[t]he phrase, 'at least in part,' requires only that the particle filter use some local transceiver timing information in this embodiment, but it also implies that the particle filter can also use timing information from other source types." *Id.* at 9 (citing Ex. 1017 ¶¶ 7–9). For example, Petitioner argues, "the particle filter is using timing information from, 'at least in part,' a Wi-Fi router — not femto base stations alone." *Id.* at 9–10 (citing Ex. 1004, 5:56–61).

On Patent Owner's argument about the focus of Pakzad's invention on indoor location services, Petitioner contends that Pakzad provides "ample disclosure of using macro base station timing information." *Id.* at 10–11 (citing Ex. 1004, 5:28–45, Fig. 1). As to Patent Owner's enablement argument, Petitioner contends that a person of ordinary skill in the art "with both sets of data before them would have no trouble adding timing information from a macro base station to a particle filter that already uses such information from a femto base station." *Id.* at 13–14 (citing Ex. 1017

¶¶ 11–14). Petitioner contends that "[b]oth femto and macro base stations use the same wireless standard, so the format of their timing information would be identical." *Id.* at 14.

(4) Patent Owner's Sur-reply

Patent Owner responds that regardless of whether Pakzad discloses multiple sources or source types, "Pakzad still does not disclose the combinational use of information from a macro base station and femto base station as required by the challenged claims." PO Sur-reply 2–3 (citing Ex. 1004, 12:45–48). Patent Owner contends that while Figure 1 of Pakzad and Figure 6 of the '819 patent may appear visually similar, but their corresponding disclosures do not show that they are the same. *Id.* at 3–5 (citing Ex. 1001, 2:12–26, 5:3–15, 5:34–67, 6:46–62, 12:51–13:25, 16:23–34, 19:18–21:3; Figs. 1–4; Ex. 1004 at 4:43–51). Patent Owner argues that the correct standard is "not whether the reference merely *permits the possibility* of the claimed invention," and that "none of Petitioners' citations to Pakzad affirmatively describes using both measurement signals from macro base stations and other measurement signals from femto base stations together." *Id.* at 6–7 (citing Ex. 1004 at 12:10–13, 13:26–33).

(5) Our Analysis

After considering the parties' arguments and evidence developed during the full trial, we determine that Petitioner has not shown by a preponderance of the evidence that Pakzad discloses the *combinational* use of information from a macro base station *and* a femto base station, as required by claim 22. We agree with Patent Owner that Petitioner's contentions are based on the argument that Pakzad may *permit* such combinational use of macro and femto base station information. But

anticipation requires "that the reference describe not only the elements of the claimed invention, but also that it describe those elements 'arranged as in the claim.'" *Net MoneyIN*, 545 F.3d at 1371.

Petitioner relies primarily on Pakzad's Figures 4A and 4B (reproduced above), and related disclosure, to argue that Pakzad discloses its particle filtering using femto base station timing information and macro base station timing information. Pet. 33–35 (citing Ex. 1004, 2:5–6, 12:5–7, 12:10–13, 12:45–48, claims 1, 25, 26, Figs. 4A, 4B; Ex. 1009 ¶ 66). But none of the cited portions of Pakzad *affirmatively* describe using information from macro base stations and femto base stations together.

Referring to the flow diagram in Figure 4A, Pakzad discloses "Block 384 may determine a target anchor node of a plurality of anchor nodes in a first routing graph connecting a plurality of cells of the area based at least in part on measurement signals." Ex. 1004, 12:10–13. Next, referring to the flow diagram in Figure 4A, Pakzad discloses that "*direct and or indirect measurements* indicative of a motion state of a mobile device may be collected from *any one of several sources* as discussed above and time referenced." *Id.* at 12:45–48. Pakzad also discloses that "a motion model (such as one applied in a particle filter) may incorporate measurements collected at block 402." *Id.* at 13:26–33; Pet. Reply 6. Although these portions describe using "measurements" and "measurement signals," it is not clear from Pakzad that these measurements come from different base stations, let alone different types of base stations.

Petitioner contends that Pakzad's reference to measurements collected from "any one of several sources" means that Pakzad's particle filter uses measurements from the three source types disclosed in Pakzad for timing information: femto base stations, macro base stations, and satellites.

Pet. Reply 3 (citing Ex. 1004, 5:13–65). But Pakzad does not disclose using information from all three types of sources *together* or *at the same time*. Patent Owner argues that "a [person of ordinary skill in the art] would understand that this passage in Pakzad '*any one of several sources*' confirms that Pakzad only uses a single signal source at a time." PO Resp. 34 (citing Ex. 2002 ¶ 69). Dr. Chrissan testifies that he understands this disclosure to mean that "Pakzad teaches a single signal source *at a time*, not more than one." Ex. 2002 ¶ 70 (emphasis added). We find Patent Owner's interpretation, supported by Dr. Chrissan's testimony, to be a reasonable reading of Pakzad's disclosure. Dr. Chrissan further testifies that "Pakzad's invention is about using both a course [*sic*] routing graph and fine routing graph to make computation of a motion model (e.g., a particle filter) more efficient," and "Pakzad was not directed to leveraging a heterogenous network by incorporating both macro and femto cells concurrently." *Id.* ¶ 68. We agree with Dr. Chrissan's explanation for the lack of clear disclosure in Pakzad about which measurements Pakzad uses with its particle filter.

Petitioner further argues that Pakzad's discussion of the use of signals acquired from local transmitters in indoor environments and "urban canyons" supports its reading of Pakzad. Pet. Reply 9 (citing Ex. 1004, 5:46–53). Pakzad discloses that:

> In particular environments such as indoor environments or urban canyons, mobile device 100 may not be capable of acquiring signals 159 from a sufficient number of SPS satellites 160 or perform AFLT or OTDOA to compute a position fix. Alternatively, mobile device 100 may be capable of computing a position fix based, at least in part, on signals acquired from local

> transmitters (e.g., WLAN access points positioned at known locations).

Ex. 1004, 5:46–53. But, as Petitioner recognizes, this merely shows that Pakzad "does not foreclose the *possibility* that Pakzad's particle filter will incorporate macro base station timing information," and "*implies* that the particle filter *can also use* timing information from other source types." Pet. Reply 9 (emphasis added). Anticipation, however, requires each claim element must be disclosed, either expressly or inherently, not merely probably or possibly be present in the prior art. Moreover, even if we were to agree with Petitioner that this disclosure implies the use of information from other sources, the example provided by Pakzad is of using WLAN access points, not a combination of sources that includes femto base stations and macro base stations. *See* Ex. 1004, 5:53–56.

Petitioner also contends that Figure 1 of Pakzad "clearly shows the UE in communication (lines 123 and 125) with both femto (115) and macro (110) base stations at the same time." Pet. Reply 5–6 (citing Ex. 1004, 1:59–61, 4:52–64, 20:14–16, Fig. 1). With reference to Figure 1, Pakzad explains that the mobile device 100 *may* communicate over either wireless communication link 110 or 125 to the two different transceivers. *See* Ex. 1004, 4:43–51 ("In one example, mobile device may communicate with a cellular communication network by transmitting wireless signals to or receiving wireless signals from a base station transceiver 110 over a wireless communication link 123."). Figure 1 of Pakzad does not disclose or even suggest that the device is connected to these transceivers at the *same* time, nor does it disclose the claimed use of macro base station timing information with femto base station timing information.

Petitioner argues that given the nature of particle filters, a restricted reading of Pakzad makes no sense in the context of location determination, and that by ignoring information from different sources, Pakzad's particle filter would needlessly produce worse location estimates than if the filter simply incorporated all of those measurements. Pet. Reply 3–8 (citing Ex. 1017 ¶¶ 5–6). Petitioner explains that "a baseball scout who intentionally overlooks batters' walk statistics while evaluating players" does so to the scout's own disadvantage, "and the same is true with regard to particle filters, which use any and all available data to produce the best possible estimate." *Id.* at 7–8. Dr. Bambos testifies that "a user of Pakzad's particle filter would have an incentive to incorporate as many available measurements as possible to help produce the best possible location estimate, given the computation resources," and "would not exclude available macro base station timing information in context of particle filters." Ex. 1017 ¶¶ 5–6.

First, we are not persuaded that both types of timing information are available for Pakzad's particle filter to use; in Petitioner's analogy, we are not so sure that the batter's walk statistics are indeed available for the scout to consider. Dr. Bambos testifies that "[t]he measurements available in Blocks 402 and 384 involve timing information from macro and femto base stations" (Ex. 1009 ¶ 66), but Dr. Bambos offers no support from Pakzad in support of that testimony.

Second, Petitioner points us to nothing in Pakzad to support Dr. Bambos's testimony or Petitioner's contention about the need to produce high quality estimates. We therefore find Dr. Bambos's testimony and Petitioner's argument unpersuasive. *See TQ Delta, LLC v. CISCO Sys., Inc.*, 942 F.3d 1352, 1361 (Fed. Cir. 2019) (explaining that "crediting such

testimony risks allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate elements from the prior art—i.e., the impermissible *ex post* reasoning and hindsight bias that *KSR* warned against"). Patent Owner argues, and we agree, that there is nothing about the "nature" of particle filters that requires the combinational use of timing information from different source types.[6] PO Sur-reply 8–9.

More importantly, anticipation requires that the four corners of a single, prior art document describe every element of the claimed invention, and we are not persuaded that Pakzad describes the combinational use of the two different types of timing information as claimed. *See Xerox Corp. v. 3Com Corp.*, 458 F.3d 1310, 1322 (Fed. Cir. 2006) (citing *Advanced Display Sys., Inc. v. Kent State Univ.,* 212 F.3d 1272, 1282 (Fed. Cir. 2000)). The Federal Circuit has made it clear that "it is not enough that the prior art reference discloses part of the claimed invention, which an ordinary artisan *might supplement to make the whole*, or that it includes multiple, distinct teachings that the artisan might somehow combine to achieve the claimed invention." *Net MoneyIN*, 545 F.3d at 1371 (citation omitted) (emphasis added). In *Net MoneyIN*, although a prior art reference described two protocols, which when taken together, disclosed "all five links arranged or combined in the same way as claimed," the Federal Circuit determined that the reference did not anticipate the claim. *See id.* Rather, the Federal

[6] Petitioner further argues that if Pakzad was indeed as limiting as Patent Owner contends, "Pakzad would expressly state that its invention is limited to using only femto base station timing information." Pet. Reply 8. As discussed above, Pakzad is not focused on the sources of location information and its lack of disclosure is not surprising. Moreover, as Patent Owner states, patentees do not normally list out limitations of their inventions. PO Sur-reply 10.

Circuit held that, in order to find anticipation, all five links would have to be described in one single protocol. *See id.* (explaining that "differences between the prior art reference and a claimed invention, however slight, invoke the question of obviousness, not anticipation"); *see also Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1343 (Fed. Cir. 2016) ("Identification of one element, the row, in one table and another element, the column, in another table is insufficient for anticipation" of "the claimed single table having a row defining a column in that same table"); *TF3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1374 (Fed. Cir. 2018) ("Claims cannot be anticipated by devices that are not the same. Invalidity for anticipation requires that the identical invention must be shown in as complete detail as contained in the patent claim." (internal quotations omitted)).

Here too, Petitioner's contentions are based not on what is disclosed in Pakzad but on the possibility that an ordinarily skilled artisan might supplement Pakzad's disclosure such that Pakzad's particle filter would use timing information from a femto base station and a macro base station together.

Lastly, Petitioner is clear that it does not rely on inherent disclosure of Pakzad for anticipation. *See* Pet. Reply 12–13 (explaining that inherency is not necessary to meet the claim limitations); Tr. 12:3–10, 38:2–5. Absent express disclosure of the claimed combinational use of femto base station timing information and macro base station timing information, and absent any contentions from Petitioner as to inherent disclosure in Pakzad, Petitioner has not met its burden to show that Pakzad discloses this limitation.

b) Conclusion as to Claim 22

Based on the foregoing, we determine, on the complete record, that Petitioner has not shown by a preponderance of the evidence that claim 22 is anticipated by Pakzad.

2. Independent Claim 30

Independent claim 30 is a method claim that recites limitations similar to those of claim 22, except the determining limitation recites "determining user equipment location information based on a first particle filtering for particle filtering the first set of particles *based on the base station information*." Ex. 1001, 34:36–46 (emphasis added). As discussed above, we adopt Patent Owner's proposed construction for "base station information."

Petitioner presents the same contentions for claim 30 as those for claim 22. *See* Pet. 21–39 (arguing the two claims together). For the same reasons as discussed with regard to claim 22, we determine, on the complete record, that Petitioner has not established by a preponderance of the evidence that Pakzad discloses the determining limitation of claim 30 and that claim 30 is anticipated by Pakzad.

F. Obviousness based on Pakzad

Petitioner contends that claims 22 and 30 are also rendered obvious by Pakzad. Pet. 3, 21–36. Petitioner first presents its contentions as to anticipation by Pakzad (Pet. 21–36), and then states that "[t]o the extent that the Board does not agree that Pakzad anticipates [c]laims 22 and 30 of the '819 [p]atent under 35 U.S.C. § 102, then Petitioner[argues] that Pakzad renders those claims obvious under 35 U.S.C. § 103." Pet. 36. Petitioner further incorporates by reference all arguments relating to its anticipation ground to its obviousness ground. *Id.* at 37 n. 12 (citing Pet. § VII.A).

Petitioner states that, under its obviousness ground, Petitioner discusses "*only* those limitations necessary to present Petitioner's obviousness argument." *Id.* (emphasis added). The *only* limitation of claims 22 and 30 that Petitioner addresses as part of its obviousness grounds is "receiving particle information for a first set of particles corresponding to possible user equipment locations." *Id.* at 37. Petitioner's contentions do not address the "determining" limitations of claims 22 and 30 under the obviousness standard. *Id.* at 37–39; *see also* Tr. 11:19–12:2, 37:21–38:2.

As Petitioner recognizes, "a patent can be obvious in light of a single prior art reference if it would have been obvious to modify that reference to arrive at the patented invention." *Id.* at 36–37 (quoting *Game & Tech. Co. v. Activision Blizzard Inc.*, 926 F.3d 1370, 1381 (Fed. Cir. 2019)). Petitioner, however, fails to present any argument as to how an ordinarily skilled artisan would have modified Pakzad to arrive at the claimed invention with respect to the determining limitation. For the reasons discussed above, Petitioner has not shown that Pakzad teaches or reasonably suggests the "determining" limitations of claims 22 and 30. *See Wasica Fin. GmbH v. Contl. Automotive Sys., Inc.*, 853 F.3d 1272, 1285 (Fed. Cir. 2017) (finding a petitioner's obviousness argument waived where the petition did "not advance a separate argument on [the obviousness] ground") (citing *Smithkline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1319 (Fed. Cir. 2006); *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369–70 (Fed. Cir. 2016); *Fresenius USA, Inc. v. Baxter Int'l, Inc.*, 582 F.3d 1288, 1296 (Fed. Cir. 2009)); *see also* Tr. 11:19–12:2. Accordingly, Petitioner has not established, by a preponderance of the evidence, that claims 22 and 30 would have been obvious over Pakzad.

G. Obviousness over Pakzad and Ketchum

Petitioner contends dependent claims 23, 32, and 33 would be obvious over the combination of Pakzad and Ketchum. Pet. 39–55. Claims 23 depends from claim 22, and claims 32 and 33 depend from claim 30, and therefore, include the "determining" limitations of claims 22 and 30 discussed above. Petitioner does not rely on Ketchum as teaching those limitations. *Id.* Accordingly, Petitioner has not established by a preponderance of the evidence that the combination of Pakzad and Ketchum would have rendered the subject matter of claims 23, 32, and 33 obvious to one of ordinary skill in the art at the time of the invention.

H. Obviousness over Pakzad, Ketchum, and Klepal

Petitioner contends that dependent claims 32 and 33 would also be obvious over the combination of Pakzad, Ketchum, and Klepal. Pet. 55–62. Claims 32, and 33 depend from claim 30 and, therefore, include the "determining" limitation of claim 30 discussed above. Petitioner does not rely on Ketchum or Klepal as teaching that limitation. *Id.* Accordingly, Petitioner has not established by a preponderance of the evidence that the combination of Pakzad, Ketchum, and Klepal would have rendered the subject matter of claims 32 and 33 obvious to one of ordinary skill in the art at the time of the invention.

IV. CONCLUSION

For the foregoing reasons, we conclude that Petitioner has not established by a preponderance of the evidence that claims 22, 23, 30, 32, and 33 of the '819 patent are unpatentable.

In summary:

Claim(s)	35 U.S.C. §	References/Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
22, 30	102	Pakzad		22, 30
22, 30	103	Pakzad		22, 30
23, 32, 33	103	Pakzad, Ketchum		23, 32, 33
32, 33	103	Pakzad, Ketchum, Klepal		32, 33
Overall Outcome				**22, 23, 30, 32, 33**

V. ORDER

It is therefore,

ORDERED that claims 22, 23, 30, 32, and 33 of the '819 patent have not been shown to be 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.

FOR PETITIONER:

Jacob K. Baron
Jacob W. S. Schneider
HOLLAND & KNIGHT LLP
Jacob.Baron@hklaw.com

FOR PATENT OWNER:

David D. Schumann
Palani Rathinasamy
Moses Xie
FOLIO LAW GROUP PLLC
david.schumann@foliolaw.com
palani@foliolaw.com
moses.xie@foliolaw.com