

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

COLLISION COMMUNICATIONS, INC.,
Patent Owner.

IPR2024-01248
Patent 9,814,071 B2

Before BART A. GERSTENBLITH, CHARLES J. BOUDREAU, and
KEVIN C. TROCK, *Administrative Patent Judges*.

GERSTENBLITH, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

A. Background

Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. (collectively, “Petitioner”) filed a Petition (Paper 3, “Pet.”) requesting institution of *inter partes* review of claims 1–11, 16, and 21 (“the Challenged Claims”) of U.S. Patent No. 9,814,071 B2 (Ex. 1001, “the ’071 patent”). Collision Communications, Inc. (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”). On March 7, 2025, we authorized each of the parties to file a two-page brief “addressing the effect of the USPTO’s recent rescission of the June 21, 2022, Director’s memorandum entitled *Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation*. Ex. 3002 (email dated Mar. 7, 2025). Thereafter, Petitioner and Patent Owner filed their respective briefs. *See* Papers 9 (Petitioner’s brief), 10 (Patent Owner’s brief).

An *inter partes* review may be instituted only if “the information presented in the petition . . . and any [preliminary] response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a) (2018). For the reasons given below, on this record Petitioner has not established a reasonable likelihood that it would prevail in showing the unpatentability of any of the Challenged Claims. Accordingly, we do not institute an *inter partes* review.

B. Related Proceedings

The parties identify the following pending litigation involving the ’071 patent: *Collision Communications, Inc. v. Samsung Electronics Co.*

Ltd., 2-23-cv-00587 (E.D. Tex.); *Collision Communications, Inc. v. Lenovo Group Limited*, 2-23-cv-00594 (E.D. Tex.); *Ericsson Inc. v. Collision Communications, Inc.*, IPR2022-01233 (PTAB); *Collision Communications, Inc. v. Telefonaktiebolaget LM Ericsson*, 2-21-cv-00327 (E.D. Tex.); and *Collision Communications, Inc. v. Nokia Corporation*,¹ 2-21-cv-00308 (E.D. Tex.). Pet. 90–91; Paper 8, 2–3. Patent Owner also identifies the following as related proceedings: IPR2024-01247, IPR2024-01249, IPR2024-01250, IPR2024-01500, IPR2025-00011, IPR2025-00284, IPR2025-00285, IPR2025-00301, IPR2025-00302, and IPR2025-00303. Paper 8, 3–4.

C. Real Parties in Interest

Petitioner identifies Samsung Electronics America, Inc. and Samsung Electronics Co., Ltd. as real parties in interest. Pet. 90. Patent Owner identifies Collision Communications, Inc. as the real party in interest. Paper 4 (Patent Owner’s Mandatory Notices), 2.

D. The Asserted Grounds of Unpatentability and Declaration Evidence

Petitioner challenges the patentability of claims 1–11, 16, and 21 of the ’071 patent on the following five grounds (Pet. 1):

¹ Patent Owner refers to the defendant in this case as “Nokia Networks & Solutions Oy.” Paper 8 (Patent Owner’s Updated Mandatory Notices), 2.

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
1–11, 16, 21	103(a)	Jin ³
6–7	103(a)	Jin, Tsai ⁴
8–9	103(a)	Jin, Vrzic ⁵
1–11, 16, 21	103(a)	Baum ⁶
6–7	103(a)	Baum, Tsai

Additionally, Petitioner supports its challenge with a Declaration of Paul S. Min, Ph.D. (Ex. 1003). Patent Owner supports its Preliminary Response with a Declaration of Giuseppe Caire (Ex. 2001).

E. The '071 Patent

The '071 patent relates to “ad hoc wireless multiuser digital communication systems.” Ex. 1001, 1:22–24. The '071 patent explains that shared, multiuser networks allowing multiple users, or “nodes,” to share a common communication medium were previously known in the art. *Id.* at 1:37–40. According to the '071 patent, although these shared networks provide certain advantages, they cannot accommodate more than one node

² The Leahy-Smith America Invents Act (“AIA”) included revisions to 35 U.S.C. § 103 that became effective on March 16, 2013. The '071 patent was filed before March 16, 2013 (*see, e.g.*, Ex. 1001, code (22)), and, therefore, we apply the pre-AIA version of the statutory basis for unpatentability.

³ U.S. Patent Application Publication No. US 2005/0286408 A1, published Dec. 29, 2005 (Ex. 1004, “Jin”).

⁴ U.S. Patent Application Publication No. US 2010/0054200 A1, published Mar. 4, 2010 (Ex. 1006, “Tsai”).

⁵ U.S. Patent Application Publication No. US 2014/0161068 A1, published June 12, 2014 (Ex. 1007, “Vrzic”).

⁶ U.S. Patent No. 5,867,478, issued Feb. 2, 1999 (Ex. 1005, “Baum”).

sending information on the shared medium at any particular time. *Id.* at 1:37–45. The '071 patent discusses the prior art shared networks in connection with Figure 1A, which is reproduced below.

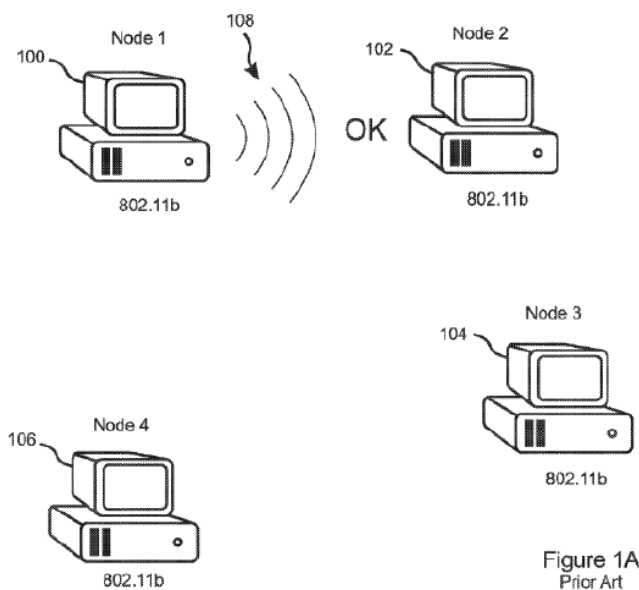


Figure 1A “is a functional diagram illustrating a single packet transmission on a shared, ad hoc, wireless, multiuser digital communication network of the prior art.” *Id.* at 6:7–9.

The communication network of Figure 1A has nodes 100, 102, 104, and 106 “in communication through a wireless 802.11b network.” Ex. 1001, 6:34–37. Figure 1A shows node 100 sending packet 108 to node 102. *Id.* at 6:41–42. During transmission of packet 108, “no other communication is attempted on the network,” which facilitates successful transmission, but requires nodes 104 and 106 to abstain from communicating, slowing communication. *Id.* at 6:42–49.

The '071 patent discloses that “[a] method is claimed that employs multiuser detection (MUD) technology so as to allow a plurality of nodes to transmit simultaneously over a shared communication channel in a wireless ad hoc digital network.” Ex. 1001, 3:17–20. The '071 patent explains that

MUD technology distinguishes, or “demodulates,” overlapping digital signals by capitalizing on differences in certain signal parameters that are applicable to the digital signals, such as, but not limited to, analog signal parameters that may include signal amplitude, signal phase, and relative time delay. In a wireless network, all of these parameters will be affected by the relative distances between nodes, as well as by the presence of any intervening buildings or other structures, or any environmental anomalies that affect, attenuate and/or reflect the signals. Multiple signals can be distinguished using MUD technology, so long as the signal parameters for each of the overlapping signals are known, or can be accurately estimated.

Id. at 7:13–25.

The '071 patent shows “an embodiment of the present invention” in Figure 1C. Ex. 1001, 7:26–27. Figure 1C is reproduced below.

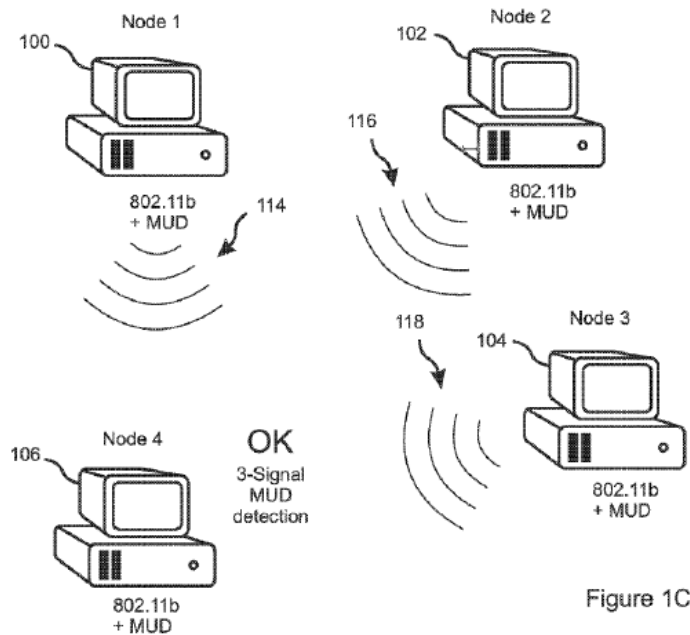


Figure 1C shows “successful simultaneous transmission of a plurality of packets on a shared, ad hoc, wireless, multiuser digital communication network.” *Id.* at 6:13–16.

The network in Figure 1C resembles the network of Figure 1A, but in the network of Figure 1C, each of nodes 100, 102, 104, 106 implements MUD detection. Ex. 1001, 7:27–30. The '071 patent explains that

a spread-spectrum technology (not illustrated) is used to provide at least three separate, low-rate parameter channels. Three of the nodes 100, 102, 104 have each acquired one of these parameter channels, and are transmitting parameter-estimating symbol patterns on the parameter channels while simultaneously transmitting data packets 114, 116, 118 to a fourth node 106.

Id. at 7:30–36. Fourth node 106's MUD detector can use the parameter-estimating symbol patterns to accurately estimate the signal parameters for the transmitting nodes. *Id.* at 7:56–59. Fourth node 106 can use the estimated parameters “to demodulate the three packets 114, 116, 118 and receive all of them.” *Id.* 7:56–61.

The '071 patent discusses communication channels in more detail in connection with Figure 3, which is reproduced below.

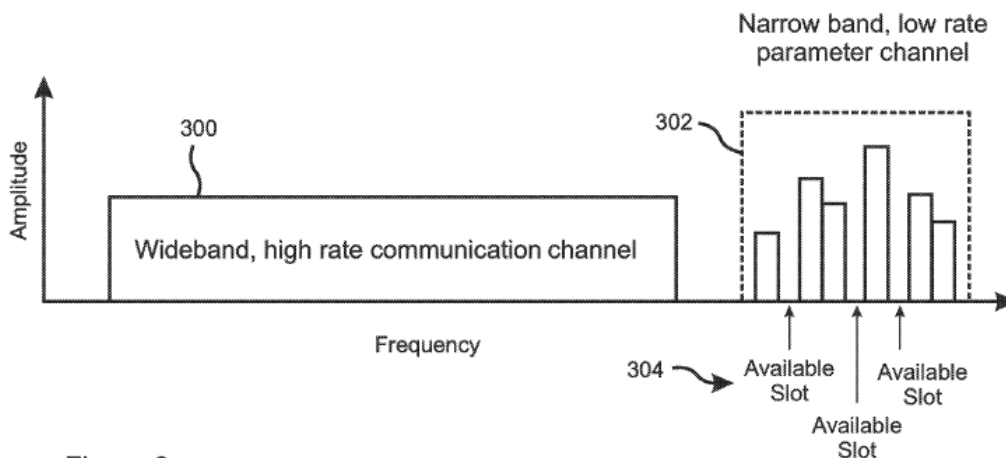


Figure 3

Figure 3 shows “FDMA spreading is used to spread a shared communication medium into a main communication channel 300 and a plurality of parameter channels 302.” Ex. 1001, 8:27–30. “The main communication

channel 300 is a high rate channel and so requires a wide frequency bandwidth. The plurality of parameter channels 302 or ‘slots’ are clustered together in a narrow range of frequencies 302.” *Id.* at 8:30–34.

The ’071 patent discusses methods of transmitting information in connection with Figure 4. Figure 4 is reproduced below.

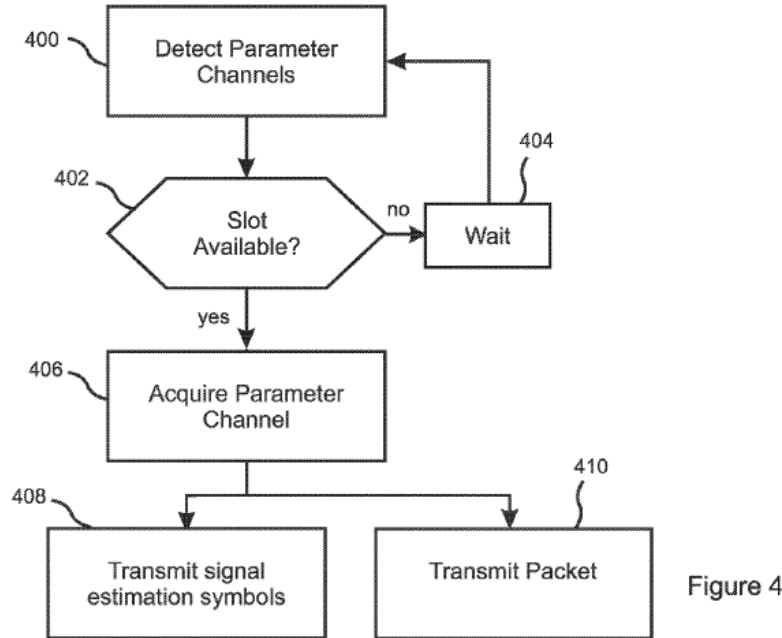


Figure 4 “is a flow diagram that illustrates the steps followed by a node that is seeking to transmit a packet on the network of [Figure] 3.” Ex. 1001, 8:43–45. At 400 and 402, the node detects parameter channels and determines if any slot is available. *Id.* at 8:46–47. If no parameter channels are available, at 404, the node waits and keeps monitoring the parameter channels. *Id.* at 8:47–49. If a parameter channel is open, at 406, the node obtains one of the parameter channels. *Id.* at 8:49–50. At 408, the node sends a parameter-estimating symbol pattern. *Id.* at 8:49–51. Simultaneously, at 410, the node transmits the packet on the main communication channel. *Id.* at 8:49–53.

The '071 patent discusses a method of receiving information in connection with Figure 5, which is reproduced below.

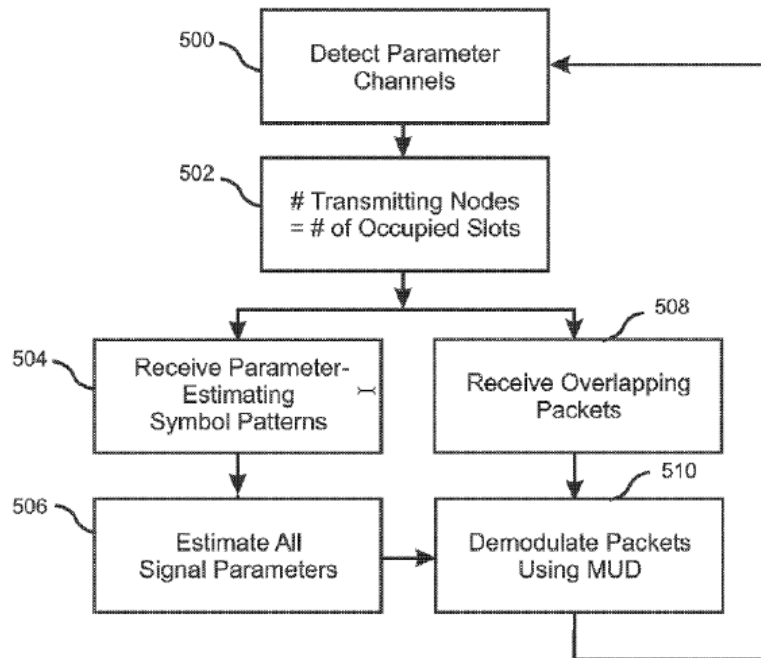


Figure 5

Figure 5 “is a flow diagram that illustrates the steps followed by a node that is seeking to receive a packet on the network of [Figure] 3.” Ex. 1001, 8:54–56. At 500, the receiving node detects and obtains all of the parameter channels’ traffic. *Id.* at 8:56–57. As shown at 502, the transmitting node can ascertain how many nodes are transmitting from the number of occupied slots. *Id.* at 8:57–59. At 504, the receiving node can use the parameter-estimating symbol patterns to estimate each transmitting node’s signal parameters, “including amplitude, phase, and relative time delay.” *Id.* at 8:59–63. At 506, “[t]he estimated parameters are then provided to the MUD detector.” *Id.* at 8:65–67. This allows the MUD detector to demodulate and individually receive the overlapping, simultaneously received information packets at 508 and 510. *Id.* at 8:65–9:2.

F. Illustrative Claim

Claims 1 and 21 are the only independent challenged claims. Each of claims 2–11 and 16 depends, directly or indirectly, from claim 1. Claim 1 is illustrative of the claimed subject matter and is reproduced below with Petitioner’s bracketing added for reference:

1. [1pre] A method for enabling a receiving node to distinguish information simultaneously received from a plurality of transmitting nodes on a shared communication channel of a wireless digital network, the method comprising:
 - [1a] providing a plurality of parameter channels on the network in addition to the shared communication channel;
 - [1b] requiring each transmitting node to transmit a parameter estimating signal on an unshared said parameter channel;
 - [1c] detecting the parameter-estimating signals on the unshared parameter channels and estimating therefrom at least one unique signal parameter for each of the transmitting nodes; and
 - [1d] detecting and distinguishing the information simultaneously received from each of the transmitting nodes according to their respective said unique estimated signal parameters.

Ex. 1001, 9:12–28; *see* Pet. vi (indicating Petitioner’s bracketing).

II. ANALYSIS

A. Legal Standards – Obviousness

The U.S. Supreme Court set forth the framework for applying the statutory language of 35 U.S.C. § 103 in *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966):

Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at

issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented.

The Supreme Court explained in *KSR International Co. v. Teleflex Inc.* that

[o]ften, it will be necessary for a court to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.

550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” (alteration in original))).

“Whether an ordinarily skilled artisan would have been motivated to modify the teachings of a reference is a question of fact.” *WBIP, LLC v. Kohler Co.*, 829 F.3d 1317, 1327 (Fed. Cir. 2016) (citations omitted). “[W]here a party argues a skilled artisan would have been motivated to combine references, it must show the artisan ‘would have had a reasonable expectation of success from doing so.’” *Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360–61 (Fed. Cir. 2017) (quoting *In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1068–69 (Fed. Cir. 2012)).

B. Level of Ordinary Skill in the Art

Petitioner, supported by Dr. Min’s testimony, proposes that a person of ordinary skill in the art at the time of the invention would have had “at least a bachelor’s [degree] in [electrical engineering, computer engineering, or computer science], physics, or equivalent, and two years of experience with cellular telecommunications, radio-access network architectures, protocols and signal propagation in wireless networks.” Pet. 8 (citing Ex. 1003 ¶¶ 54–56). Petitioner further proposes that “[m]ore education can supplement practical experience and vice versa.” *Id.* (citing Ex. 1003 ¶¶ 54–56).

In its Preliminary Response, Patent Owner does not take a position on the relevant level of ordinary skill in the art. *See generally* Prelim. Resp.

At this stage of the proceeding and on the present record, we adopt Petitioner’s uncontested proposed level of ordinary skill in the art, which we find consistent with the level of ordinary skill in the art reflected by the ’071 patent and the prior art of record. *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).

C. Claim Construction

In an *inter partes* review proceeding, 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) (2024). The claim construction standard includes construing claims in accordance with the ordinary and customary meaning of such claims, as would have been 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.

Additionally, only terms that are in controversy need to be construed, and these need be construed only to the extent necessary to resolve the controversy. *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)).

Neither party proposes a specific construction of any claim term, although Petitioner contends each term should be construed according to its plain and ordinary meaning. Pet. 16; *see generally* Prelim. Resp. Accordingly, we need not construe any claim terms expressly because the meaning of the terms is not in dispute and an express construction is not necessary to resolve the controversy before us.

D. Ground 1: Obviousness over Jin

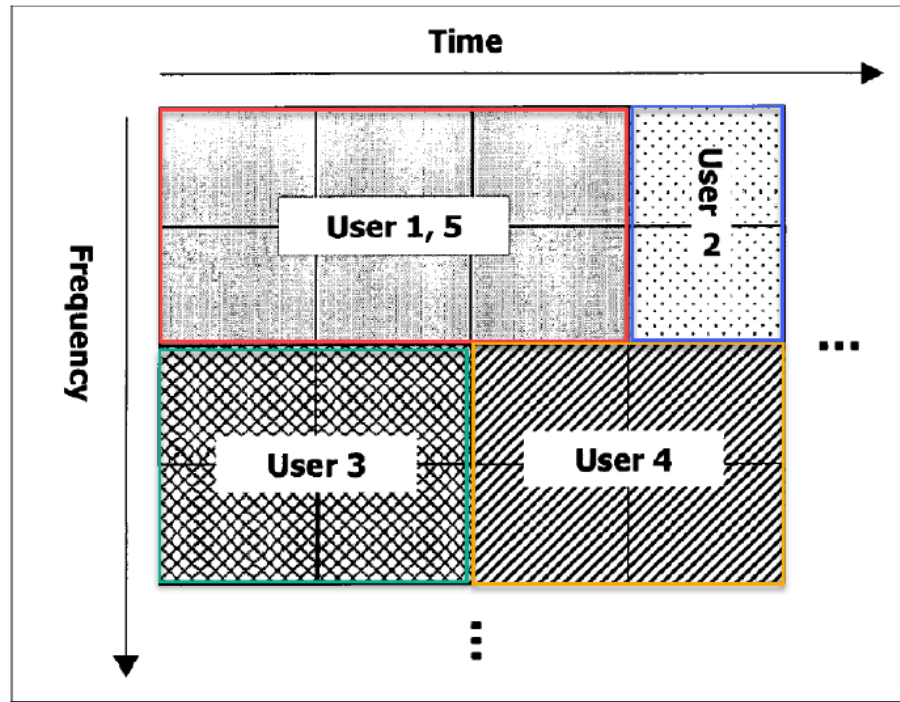
Petitioner, relying on the testimony of Dr. Min, contends that the Challenged Claims would have been obvious to one of ordinary skill in the art in light of Jin. Pet. 26–45. Patent Owner opposes Petitioner’s challenge. *See, e.g.*, Prelim. Resp. 17–23.

1. Scope and Content of the Prior Art

a. Jin (Ex. 1004)

Jin is directed to an Orthogonal Frequency Division Multiplexing Access (“OFDMA”) type system and “particularly, to allocation of radio

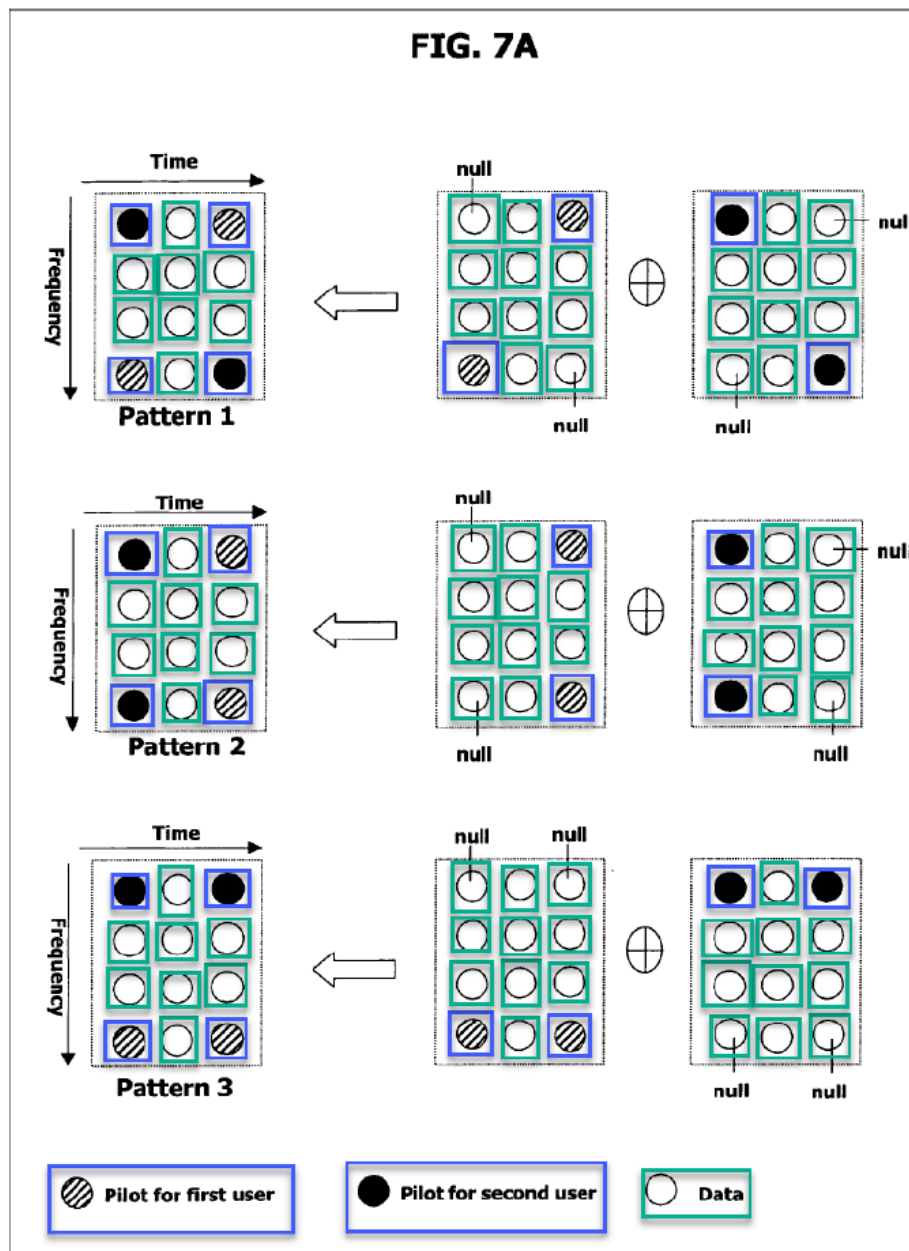
resources in the OFDMA system.” Ex. 1004 ¶ 2. Petitioner’s annotated version of Jin’s Figure 5 is reproduced below.⁷



Pet. 17; Ex. 1004, Fig. 5. Figure 5 “illustrates an allocation of an uplink radio resource in an OFDM/OFDMA system.” Ex. 1004 ¶ 45. Petitioner’s annotations add color to identify the allocation of radio resources to five users (mobile terminals). Pet. 17; *see* Ex. 1004 ¶ 56 (describing Figure 5). Jin explains that, in Figure 5, the same radio resource is allocated to user 1 and user 5. Ex. 1004 ¶ 56.

Jin teaches using a pilot pattern to identify the data of two users, as reflected in Petitioner’s annotated version of Figure 7A reproduced below.

⁷ We use several of Petitioner’s annotated figures because they are colored and more clearly distinguish the various aspects of the figures. *See, e.g.*, Pet. 17.



Pet. 19; Ex. 1004, Fig. 7A. Figure 7A “illustrates pilot patterns for multi-users.” Ex. 1004 ¶ 47. Petitioner’s annotations add color to identify the pilots of the first and second users (blue) and the data (green). Pet. 19; *see* Ex. 1004 ¶ 74 (describing Figure 7A). Jin explains that patterns 1, 2, and 3 in Figure 7A reflect that “user 1 and user 5 use different pilots, respectively, and thus, the data of the two users can be identified.” Ex. 1004

¶ 74. Jin teaches that “[t]he base station uses a pilot signal for measuring the radio channel for each user and compensating the channel, and applies it to a method for dividing data of users.” *Id.* ¶ 78.

2. Claim 1

Petitioner contends Jin would have rendered the subject matter of claim 1 obvious to one of ordinary skill in the art. Pet. 26–34. Patent Owner contends that the Petition fails to identify the claimed estimated unique signal parameters recited by limitations 1c and 1d. Prelim. Resp. 17–20. Because we find this issue dispositive for Petitioner’s challenge based on Jin, we focus our discussion there.

Before turning to Petitioner’s argument directed to limitations 1c and 1d, it is useful to acknowledge how the Petition maps the teachings of Jin to the language of claim 1. In particular, when addressing claim 1, Petitioner identifies an element in Jin and follows that element with a parenthetical that contains, in bold font and quotations, the claim language that Petitioner asserts is met by the identified element in Jin. For example, in addressing a portion of the preamble of claim 1 (“[a] method for enabling a receiving node to distinguish information simultaneously received”), the Petition states: “Jin’s base station (*i.e.*, ‘**receiving node**’)” Pet. 26. Based on this statement, we understand Petitioner to assert that Jin’s base station teaches the “receiving node” recited in the preamble of claim 1. For this language of the preamble, the Petition is clear.

Turning to limitations 1c and 1d, those limitations recite the following:

1c: “detecting the parameter-estimating signals on the unshared parameter channels and *estimating* therefrom *at least one*

unique signal parameter for each of the transmitting nodes;
and”

1d: “detecting and distinguishing the information
simultaneously received from each of the transmitting nodes
according to their respective said *unique estimated signal
parameters*.”

Pet. vi (emphasis added); *see* Ex. 1001, 9:21–28. The Petition maps the
elements from Jin to limitations 1c and 1d as follows:

- pilot patterns (*i.e.*, “**parameter-estimating signals**”);
- pilot subchannels where different pilot subchannels correspond
to a different user (*i.e.*, “**unshared parameter channels**”);
- each user (*i.e.*, “**transmitting node**”);
- phase differences and radio channel parameters are **unique
signal parameters**;
- data (*i.e.*, “**information**”);
- data is received simultaneously (*i.e.*, “**information
simultaneously received**”);
- unique pilot parameter (*i.e.*, “**unique estimated signal
parameters**”); and
- identify which user (*i.e.*, mobile terminal) has transmitted the
received data (*i.e.*, “**detecting and distinguishing**”).

Pet. 33–34.

Patent Owner contends, *inter alia*, that the Petition fails to satisfy
limitation 1d because (1) Jin does not disclose a “unique pilot parameter”;
(2) even assuming Petitioner intended to identify Jin’s pilot *pattern*, Jin’s
pilot pattern cannot be the claimed “unique estimated signal parameters”
because the pilot patterns are known beforehand since they are transmitted

from the base station to the transmitting nodes and, therefore, they are not estimated; and (3) the Petition inconsistently identifies which disclosure in Jin teaches the unique estimated signal parameters. Prelim. Resp. 19–20.

We find the Petition lacking in particularity because it does not clearly identify what aspect of Jin is alleged to teach the unique signal parameters (or unique estimated signal parameters) recited in claim 1. *See, e.g.*, 35 U.S.C. § 312(a)(3) (“A petition filed under section 311 may be considered only if — (3) the petition identifies, in writing and with particularity, . . . the evidence that supports the ground for the challenge to each claim . . .”). First, as reflected above, the Petition asserts that something called a “unique pilot parameter” teaches the recited unique estimated signal parameters. But “unique pilot parameter” is not a term or phrase recited in Jin. *See* Prelim. Resp. 19 (arguing the same). So, when Petitioner states “Jin discloses that the base station uses the unique pilot parameter (*i.e.*, ‘**unique estimated signal parameters**’) to ‘identify which user (*i.e.*, mobile terminal) has transmitted the received data,’” it is not clear what element in Jin Petitioner intends to identify by the term “unique pilot parameter.” Dr. Min’s testimony does not help resolve the ambiguity in the Petition. In particular, Dr. Min also refers to a “unique pilot parameter (*i.e.*, ‘**unique signal parameter**’) for each user.” Ex. 1003 ¶ 89. But, as noted above, Jin does not disclose an element referred to as a “pilot parameter” and it is not clear what element Dr. Min intended to identify in Jin.⁸

⁸ An additional point of confusion is reflected in the Petition’s and Dr. Min’s use of “pilot parameter” as teaching “unique estimated signal parameter” on the one hand and “unique signal parameter” (omitting the term “estimated”) on the other. *Compare* Pet. 34 (equating unique pilot parameter with

Second, if Petitioner intended to refer to a “pilot pattern,” we agree with Patent Owner that Jin’s pilot patterns do not teach the “unique estimated signal parameters” of limitation 1d. Prelim. Resp. 20. As Patent Owner points out, Jin’s pilot patterns are known beforehand since they are transmitted from the base station to the transmitting nodes, and, therefore, are not estimated as required by limitation 1d. *See, e.g.*, Ex. 1004 ¶ 67 (“The base station transmits predetermined information (i.e., . . . pilot pattern . . .) to the two users”); Prelim. Resp. 20 (arguing the same).

Third, the Petition appears inconsistent in its identification of an element in Jin that Petitioner contends teaches a unique signal parameter. In particular, the Petition first identifies “phase differences and radio channel parameters” as “**unique signal parameters**” in the context of limitation 1c. Pet. 34 (“The phase differences and radio channel parameters are **unique signal parameters**.” (citing Ex. 1003 ¶ 89)). Then, when addressing limitation 1d, Petitioner points to “the unique pilot parameter” as teaching “unique estimated signal parameters.” *Id.* (“Jin discloses that the base station uses the unique pilot parameter (*i.e.*, ‘**unique estimated signal parameters**’) to ‘identify which user (*i.e.*, mobile terminal) has transmitted the received data’” (citing Ex. 1004 ¶¶ 72, 78; Ex. 1003 ¶ 91)). In other words, the Petition appears inconsistent as to what aspect of Jin teaches the recited unique estimated signal parameters. And we cannot discern whether Petitioner relies on the (unknown) “unique pilot parameter” as Petitioner states in limitation 1d or the “phase differences and radio channel parameters” as Petitioner states in limitation 1c.

“unique estimated signal parameters), *with* Ex. 1003 ¶ 89 (equating unique pilot parameter with “unique signal parameter”).

For the reasons discussed above, we find that the Petition lacks particularity by failing to clearly and consistently identify what aspect of Jin teaches the recited unique estimated signal parameters or unique signal parameters. Therefore, we find that Petitioner has not shown that Jin teaches the subject matter of claim 1.

3. Claims 2–11, 16, and 21

Claims 2–11 and 16 depend, directly or indirectly, from claim 1. Therefore, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of dependent claims 2–11 and 16.

Independent claim 21 recites subject matter substantially similar to claim 1, and Petitioner relies on the arguments and evidence presented in the context of claim 1 when addressing claim 21. *See* Pet. 45 (identifying the limitations of claim 21 and the corresponding limitations of claim 1). Specifically, Petitioner relies on its arguments and evidence directed to limitations 1c and 1d when addressing limitations 21b and 21c, respectively. *Id.* Thus, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of independent claim 21.

Accordingly, for the reasons discussed above and in the context of claim 1, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that Jin teaches the subject matter of claims 2–11, 16, and 21.

E. Ground 2: Obviousness over Jin and Tsai

Ground 3: Obviousness over Jin and Vrzic

Petitioner contends the combination of Jin and Tsai would have rendered the subject matter of claims 6 and 7 obvious to one of ordinary skill in the art. Pet. 45–51. And Petitioner contends the combination of Jin and

Vrzic would have rendered the subject matter of claims 8 and 9 obvious to one of ordinary skill in the art. *Id.* at 51–58. Claims 6–9 depend from claim 1. Petitioner does not rely on Tsai or Vrzic to address limitations 1c or 1d. Therefore, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of dependent claims 6–9.

Accordingly, for the reasons discussed above and in the context of claim 1, we find the Petition deficient, and, therefore, we determine that (1) Petitioner has not shown that the combination of Jin and Tsai teaches the subject matter of claims 6 and 7, and (2) Petitioner has not shown that the combination of Jin and Vrzic teaches the subject matter of claims 8 and 9.

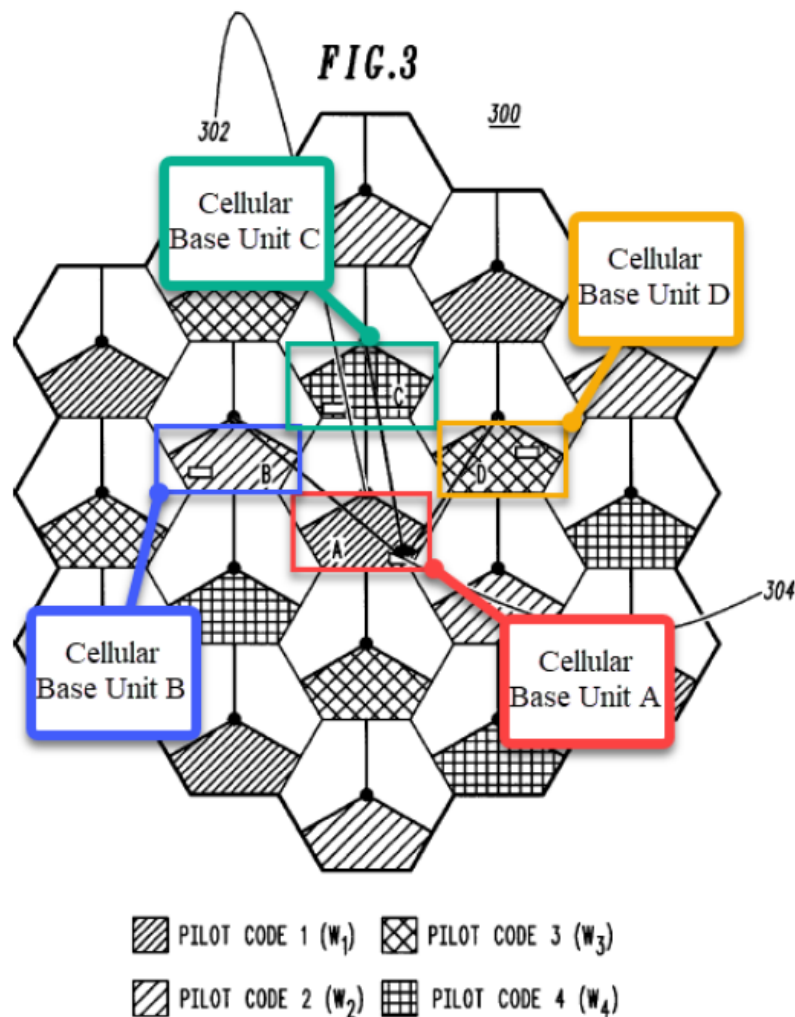
F. Ground 4: Obviousness over Baum

Petitioner, relying on the testimony of Dr. Min, contends that the Challenged Claims would have been obvious to one of ordinary skill in the art in light of Baum. Pet. 58–77. Patent Owner opposes Petitioner’s challenge. *See, e.g.*, Prelim. Resp. 23–28.

1. Scope and Content of the Prior Art

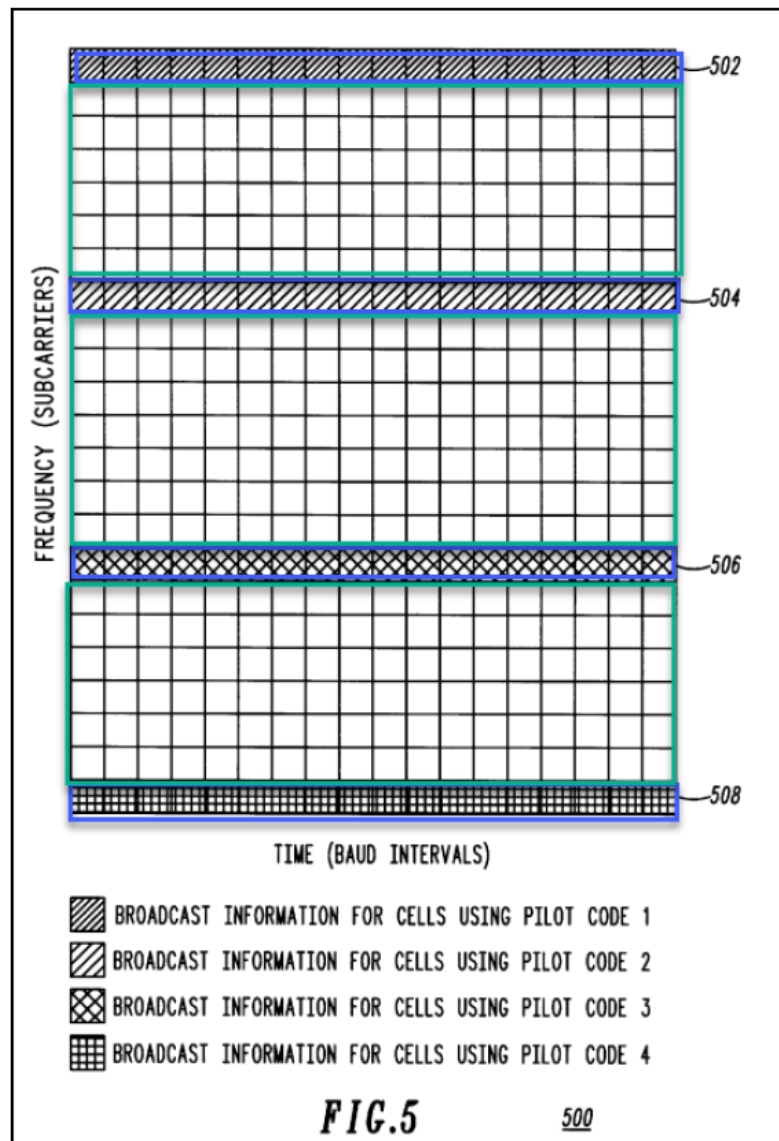
a. Baum (Ex. 1005)

Baum teaches a multi-user detection system and method and is directed to “orthogonal frequency division multiplexing (OFDM) wireless communication systems, and in particular, to reducing the impact of interference in OFDM wireless communication systems.” Ex. 1005, 1:7–10, 5:17–47, 18:1–8. Baum discloses a cellular network with four base units in different sectors, each of which transmits over both shared and unshared communication channels, as reflected in Petitioner’s annotated version of Figure 3 reproduced below.



Pet. 21; Ex. 1005, Fig. 3. Figure 3 “is a graphic representation of a single cell re-use pattern with three sectors per cell and an associated pilot code re-use pattern.” Ex. 1005, 1:50–53. Petitioner annotates the four different cellular base units A–D with different colors: A (red), B (blue), C (green), D (orange). Pet. 20–21.

Baum teaches using a synchronization signal sent on an unshared channel for identifying the user for the data that is sent on a shared channel, as illustrated in Petitioner's annotated version of Figure 5 below. *See* Ex. 1005, 10:5–23.



Pet. 22; Ex. 1005, Fig. 5. Figure 5 “illustrate[s] . . . [a] scheme[] for coordinating the transmission of synchronization signals in a frame by a plurality of base units.” Ex. 1005, 1:53–54–56. Petitioner annotates the figure by adding color to show the unshared channel (blue) and the shared channel (green). Pet. 21–22. Baum explains that “a set of 4 subcarriers (502, 504, 506, 508), as indicated by shading in the figure, are for the transmission of synchronization signals by a plurality of base units. Ex. 1005, 10:5–11. Baum teaches that this “scheme for coordinating the

transmission of synchronization signals in a frame by a plurality of base units avoids co-channel interference on the synchronization signal from base units which use different pilot codes.” *Id.* at 10:49–53.

2. *Claim 1*

Petitioner contends Baum would have rendered the subject matter of claim 1 obvious to one of ordinary skill in the art. Pet. 58–77. Patent Owner asserts, *inter alia*, that the Petition fails to address each of the requirements of limitation 1b and, therefore, Petitioner fails to show that Baum teaches the subject matter of claim 1. Prelim. Resp. 23–26. Because we find this issue dispositive for Petitioner’s challenge based on Baum, we focus our discussion there.

Limitation 1b recites “requiring each transmitting node to transmit a parameter-estimating signal on an unshared said parameter channel.” Pet. vi; Ex. 1001, 9:18–20. Petitioner divides limitation 1b into two sub-clauses: (1) “parameter estimating signal” and (2) “each transmitting node transmits a parameter-estimating signal on an unshared said parameter channel.” Pet. 64 (emphasis omitted).

Addressing the “parameter estimating signal” clause, Petitioner maps Baum’s synchronization signal to the recited parameter-estimating signal. Pet. 64. Petitioner contends Baum’s synchronization signals are parameter-estimating signals because “they are used to estimate relative propagation delays and adjacent-subcarriers phase differences.” *Id.* (citing Ex. 1005, 9:27–36; Ex. 1003 ¶ 158).

Addressing the phrase “each transmitting node transmits a parameter-estimating signal on an unshared said parameter channel,” Petitioner contends that Baum “discloses that synchronization signals from two

different base stations are ‘non-interfering,’ as they are transmitted using different ‘time/frequency’ resources.” Pet. 64 (citing Ex. 1005, 10:5–11, 24:39–50; Ex. 1003 ¶ 159). Petitioner further contends:

Baum discloses “synchronization signals . . . may typically be one of: A) non-interfering with a synchronization/identification signal from another [Synchronous Coherent-Orthogonal Frequency Division Multiplexing (“SC-OFDM”)] transmitter . . . the SC-OFDM transmitter may transmit at least one of the synchronization signal and the identification signal at a different time/frequency/[] than the synchronization/identification signal transmitted by the other SC-OFDM transmitter.”

Id. at 64–65 (first alteration added, omissions and second alteration in original) (quoting Ex. 1005, 24:39–50). Petitioner asserts “Baum’s different, non-interfering, time and/or frequency regions for transmitting synchronization signals (‘parameter-estimating signal’) are the claimed ‘unshared said parameter channel.’” *Id.* at 65 (citing Ex. 1003 ¶ 159).

Patent Owner contends that, “[a]s an initial matter, neither the Petition nor Dr. Min even attempts to address the ‘requiring’ aspect of this claim limitation and simply ignores it.” Prelim. Resp. 24 (citing Pet. 64–65; Ex. 1003 ¶¶ 157–159; Ex. 2001 ¶ 51). Patent Owner asserts that Petitioner ignores the “requiring” aspect of limitation 1b because the synchronization signal identified in Baum “is not required to be transmitted and is optional.”

Id. Patent Owner contends that

Baum does not require all the transmitting nodes to transmit a parameter-estimating signal on an unshared parameter channel, and the portion of *Baum* relied upon in the Petition demonstrates just the opposite - that transmission of the

synchronization signal is optional and not a required signal as in claim limitation 1b.

Id. at 25 (citing Ex. 2001 ¶ 53).

Patent Owner provides the following portion of Baum, on which the Petition relies, with emphasis added by Patent Owner:

The SC-OFDM transmitter *may, where selected*, transmit *at least one of: synchronization signals and identification signals*. *At least one of: the synchronization signals and the identification signals* may typically be one of:

A) non-interfering with a synchronization/identification signal from another SC-OFDM transmitter; and B) separable from a synchronization/identification signal from another SC-OFDM transmitter. *Where selected*, the SCOFDM transmitter *may* transmit *at least one of the synchronization signal and the identification signal* at a different time/frequency/code than the synchronization/identification signal transmitted by the other SC-OFDM transmitter.

Prelim. Resp. 25 (quoting Ex. 1005, 24:39–50) (citing Pet. 64). Patent Owner contends this portion of Baum indicates that “the SC-OFDM transmitter that the Petition relies upon need only transmit ‘*at least one of the synchronization signal and the identification signal*’ at a different time and frequency as the signal transmitted by the other transmitter.” *Id.* (citing Ex. 2001 ¶ 53). Therefore, Patent Owner asserts, “because the transmission of the synchronization signal is optional, there is no ‘requiring’ that each transmitting node transmits the synchronization signal on the alleged unshared parameter channel.” *Id.* at 26 (citing Ex. 2001 ¶ 53). Rather, Patent Owner notes that “instead of the synchronization signal, the SC-OFDM transmitter can transmit an identification signal.” *Id.* (citing Ex. 1005, 24:39–50; Ex. 2001 ¶ 53). Additionally, Patent Owner argues that “the lenient language in *Baum* such as ‘may’ and ‘where selected’

highlighted in the passage above is not consistent with the requiring element of claim limitation 1b.” *Id.* (citing Ex. 2001 ¶ 54).

As noted above, limitation 1b recites “*requiring* each transmitting node to transmit a parameter-estimating signal on an unshared said parameter channel.” Pet. vi (emphasis added); Ex. 1001, 9:18–20. The Petition, however, fails to (1) acknowledge that limitation 1b recites the term “requiring” and (2) identify where or how Baum teaches such a requirement. *See* Pet. 64–65. First, as noted above, when the Petition identifies limitation 1b, it divides limitation 1b into two aspects—“parameter estimating signal” and “each transmitting node transmits a parameter-estimating signal on an unshared said parameter channel.” *Id.* at 64 (emphasis omitted). But neither of those clauses includes the recited “requiring” term of limitation 1b. Second, when addressing limitation 1b, the Petition does not refer to or mention the term “requiring” and does not identify anything in Baum as being *required*. *See id.* at 64–65. For purposes of comparison, when addressing limitation 1b in the context of Ground 1 (based on Jin), Petitioner at least asserts that “Jin discloses that each transmitting node is *required* to transmit parameter-estimating signals.” Pet. 30 (emphasis added). But in the context here (Ground 4 based on Baum), there is no similar statement or assertion in the Petition. In other words, Petitioner does not even attempt to explain how Baum meets the “requiring” recitation of limitation 1b.⁹ Thus, on the present record, we find the Petition deficient for failing to address the full scope of limitation 1b.

⁹ Dr. Min’s testimony similarly omits any mention of the recited “requiring” term of limitation 1b. Ex. 1003 ¶¶ 157–159.

Accordingly, for the reasons discussed above, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that Baum teaches the subject matter of claim 1.

3. *Claims 2–11, 16, and 21*

Claims 2–11 and 16 depend, directly or indirectly, from claim 1. Therefore, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of dependent claims 2–11 and 16.

Independent claim 21 recites subject matter substantially similar to claim 1, and Petitioner relies on the arguments and evidence presented in the context of claim 1 when addressing claim 21. *See* Pet. 77 (identifying the limitations of claim 21 and the corresponding limitations of claim 1). Specifically, Petitioner relies on its arguments and evidence directed to limitations 1b when addressing limitation 21a. *Id.* Thus, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of independent claim 21.

Accordingly, for the reasons discussed above and in the context of claim 1, we find the Petition deficient and, therefore, we determine that Petitioner has not shown that Baum teaches the subject matter of claims 2–11, 16, and 21.

G. Ground 5: Obviousness over Baum and Tsai

Petitioner contends the combination of Baum and Tsai would have rendered the subject matter of claims 6 and 7 obvious to one of ordinary skill in the art. Pet. 77–82. Claims 6 and 7 depend from claim 1. Petitioner does not rely on Tsai to address limitation 1b. Therefore, the deficiency identified in the Petition regarding claim 1 also applies to the Petition’s analysis of dependent claims 6 and 7.

Accordingly, for the reasons discussed above and in the context of claim 1, we find the Petition deficient, and, therefore, we determine that Petitioner has not shown that the combination of Baum and Tsai teaches the subject matter of claims 6 and 7.

III. CONCLUSION

For the reasons discussed above, we find that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that any of the Challenged Claims of the '071 patent is unpatentable.

IV. DISCRETIONARY DENIAL

Patent Owners contends that the factors set forth in *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 at 9 (PTAB Mar. 20, 2020) (precedential), weigh heavily in favor of discretionary denial. Prelim. Resp. 29–35; Paper 10. Petitioner disagrees. Pet. 82–85; Paper 9. In light of the conclusion reached above, we need not address the parties' arguments regarding discretionary denial.

V. ORDER

Accordingly, it is

ORDERED that the Petition is *denied* as to the Challenged Claims of the '071 patent; and

FURTHER ORDERED that no *inter partes* review is instituted.

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