

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.

IPR2024-01247
Patent 7,593,492 B1

Before NEIL T. POWELL, CHARLES J. BOUDREAU, and
DONALD E. DAYBELL, *Administrative Patent Judges*.

DAYBELL, *Administrative Patent Judge*

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

I. INTRODUCTION

Samsung Electronics America, Inc. and Samsung Electronics Co. Ltd. (collectively, “Petitioner”) filed a Petition requesting *inter partes* review of claims 1–18 (“challenged claims”) of U.S. Patent No. 7,593,492 B1 (Ex. 1001, “the ’492 Patent”) pursuant to 35 U.S.C. §§ 311–319. Paper 3

(“Pet.”). Collision Communications, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). We authorized Petitioner to file a Preliminary Reply and Patent Owner to file a Preliminary Sur-Reply. Paper 10; Paper 11 (“Prelim. Reply”); Paper 13 (“Prelim. Sur-Reply”).

We have authority under 35 U.S.C. § 314 and 37 C.F.R. § 42.4 to determine whether to institute review. Upon consideration of the arguments and evidence before us, we conclude that it would not be an efficient use of the Board’s resources to institute review in this proceeding, and thus we exercise our discretion to decline to institute review.

The Petition is *denied*, and *inter partes* review is not instituted.

A. Real Parties in Interest

Petitioner identifies itself as real party in interest. Pet. 60. Patent Owner identifies itself as real party in interest. Paper 5, 2 (Mandatory Notices).

B. Related Matters

Each party identifies the following related matter:

Collision Communications, Inc. v. Samsung Electronics Co., Ltd. et al., No. 2-23-cv-00587 (E.D. Tex.) (“the underlying litigation”). Pet. 60; Paper 12, 2 (Updated Mandatory Notices).

Patent Owner further identifies the following District Court proceedings:

Collision Communications, Inc. v. Nokia Networks & Solutions Oy, No. 2:21-cv-000308 (E.D. Tex.);

Collision Communications, Inc. v. Lenovo Group Limited, No. 2-23-cv-00594 (E.D. Tex.); and

Collision Communications, Inc. v. Telefonaktiebolaget LM Ericsson, et al., No. 2-21-cv-00327 (E.D. Tex.).

Paper 12, 2.

Patent Owner additionally identifies the following IPR proceedings:

Petition for *Inter Partes* Review of U.S. Patent No. 9,814,071, *Ericsson Inc. et al. v. Collision Communications, Inc.*, IPR2022-01233 (PTAB July 20, 2022);

Petition for *Inter Partes* Review of U.S. Patent No. 9,814,071, *Samsung Electronics America, Inc. et al v. Collision Communications, Inc.*, IPR2024-01248 (PTAB August 2, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 6,947,505, *Samsung Electronics America, Inc. et al. v. Collision Communications, Inc.*, IPR2024-01249 (PTAB August 1, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 8,089,946, *Samsung Electronics America, Inc. et al. v. Collision Communications, Inc.*, IPR2024-01250 (PTAB August 2, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 7,463,703, *Samsung Electronics America, Inc. et al. v. Collision Communications, Inc.*, IPR2024-01500 (PTAB September 30, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 7,920,651, *Samsung Electronics America, Inc. et al. v. Collision Communications, Inc.*, IPR2025-00011 (PTAB October 2, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 8,089,946, *Lenovo (United States) Inc. et al. v. Collision Communications, Inc.*, IPR2025-00284 (PTAB December 12, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 6,947,505, *Lenovo (United States) Inc. et al. v. Collision Communications, Inc.*, IPR2025-00285 (PTAB December 12, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 9,814,071, *Intel Corporation et al. v. Collision Communications, Inc.*, IPR2025-00301 (PTAB December 12, 2024);

Petition for *Inter Partes* Review of U.S. Patent No. 7,920,651, *Intel Corporation et al. v. Collision Communications, Inc.*, IPR2025-00302 (PTAB December 12, 2024); and

Petition for *Inter Partes* Review of U.S. Patent No. 7,463,703, *Intel Corporation et al. v. Collision Communications, Inc.*, IPR2025-00303 (PTAB December 12, 2024).

Paper 12, 2–4.

*C. The '492 Patent*¹

The '492 Patent is directed to a multi-user detector system for use in wireless communications. Ex. 1001, code (57). The '492 Patent seeks to solve problems with multi-user wireless environments, where many signals from many users are received at the same time at a wireless receiver. *Id.* at 1:25–44. To effectively process such signals, it is necessary to detect and isolate the signals from each user. *Id.* at 1:44–51. The detection of a given user's signal is more or less difficult, depending on various factors relating to the wireless transmission environment. *Id.*

A variety of different multi-user detectors are known in the art, of varying complexities. *Id.* at 5:5–6:30. In general, the higher the complexity

¹ The '492 Patent issued from Application No. 11/532,125, filed Sept. 15, 2006. Ex. 1001, codes (21), (22).

the detector, the more effective it is at identifying a given user's signal in a difficult transmission environment. *Id.* at 5:5–13. The higher complexity detectors, however, are also slower than the lower complexity detectors. *Id.* Thus, it is desirable according to the '492 Patent to select the appropriate detector based on the transmission conditions then present. *Id.* at 7:10–38.

An illustrative embodiment of the subject matter of the '492 Patent is depicted in Figure 2, reproduced below.

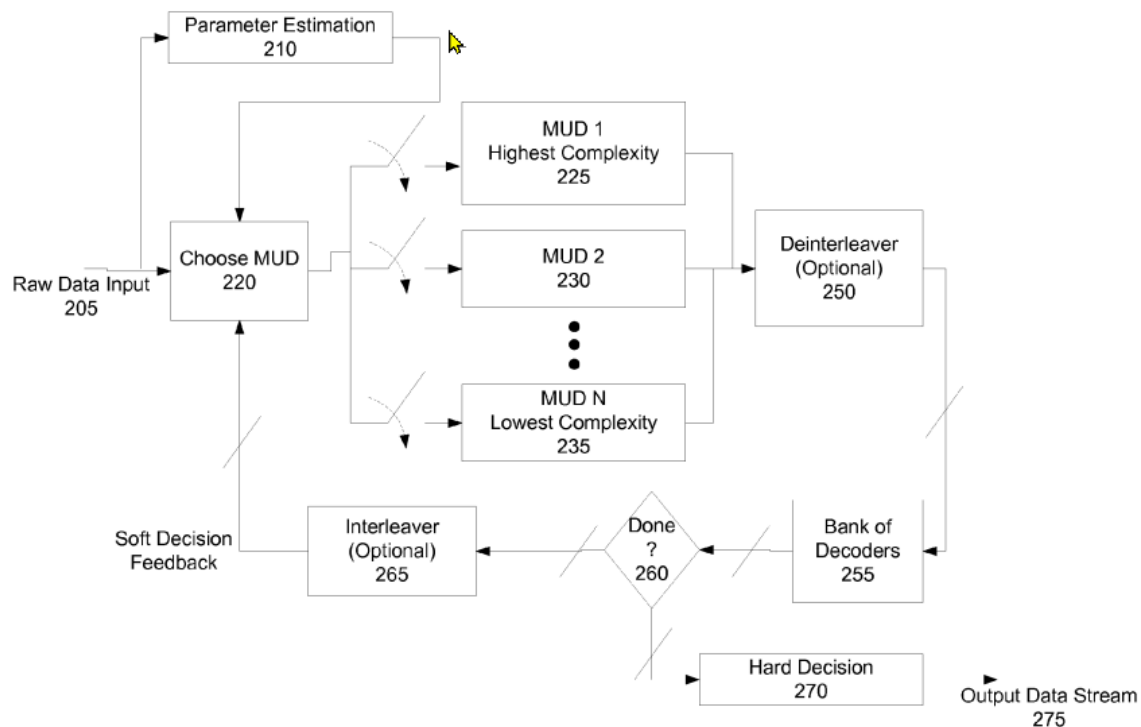


Figure 2

Figure 2 depicts a system for identifying the data streams of multiple users of a wireless communications device such as a wireless access point or router. Ex. 1001, 12:52–67. Raw data input 205 is input to the system. *Id.* at 13:1–7. This raw data is provided to a parameter estimator 210 and a multi-user detector decision unit 220. *Id.* The parameter estimator 210 provides information on the received signals, which is used by some multi-user detection units (MUDs) to facilitate processing and provides its output to the

multi-user detector decision unit 220. *Id.* at 13:17–27. The multi-user detector decision unit 220 also receives a soft decision feedback, which will be discussed in more detail below. *Id.* at 13:29–32. Multi-user detector decision unit 220 uses one of a variety of disclosed algorithms to decide which multi-user detector 225, 230, 235 to select for processing the raw data input. *Id.* at 13:33–14:40; *see also id.* at 8:12–18, 15:3–21, 19:43–48, 19:56–62, 20:41–49. The multi-user detectors 225, 230, 235 range from a high complexity detector through a lowest complexity detector. *Id.* 14:48–55.

Once a given multi-user detector operates on the incoming data stream, the resulting signals are optionally run through a deinterleaver 250, and then decoded by a bank of decoders 255. *Id.* at 13:27–32, 15:22–28. A check 260 is made to determine whether the signals have been adequately processed. *Id.* at 15:31–35. If not, then the signals are optionally run through an interleaver 265, and a “soft” decision² about how the signals are proposed to be detected is fed back to the multi-user detector decision unit 220 for further processing. *Id.* at 15:35–46. If the signals are adequately processed, then a “hard” decision³ unit 270 allocates each of the user’s signals as detected and outputs a data stream 275 containing each user’s signals, separated from each other. *Id.* at 15:53–59.

² A “soft” decision is described in the ’492 Patent as an estimated prediction of which user a given signal stream belongs to, which is used to further refine the accuracy of the multi-user detection method. Ex. 1001, 15:22–26.

³ A “hard” decision is described in the ’492 Patent as the final decision of the multi-user detector system indicating which user has been assigned to a given signal stream. Ex. 1001, 15:53–59.

D. Illustrative Claims

Claims 1–16 are the subject of Ground 1. Pet. 4. Claims 17 and 18 are the subject of Ground 2. *Id.* Claim 1 is illustrative of Ground 1, and claim 17 is illustrative of Ground 2. These claims are reproduced below.⁴

Claim 1:

[1pre] A hybrid Multi-User Detector System for processing received signals, comprising:

[1a] a parameter estimator coupled to said received signals providing received data information;

[1b] a multi-user detector decision unit coupled to said parameter estimator and said received signals;

[1c] at least two multi-user detectors coupled to said parameter estimator and said multi-user detector decision unit, said multi-user detector decision unit using decision criteria to determine a selected multi-user detector,

[1d] wherein said selected multi-user detector outputs a plurality of information streams, one stream corresponding to each of said received signals; and

[1e] a bank of decoders coupled to said plurality of information streams, wherein said decoders output a plurality of improved information streams.

Ex. 1001, 23:31–46.

⁴ The headings with bracketed letters identifying each of the claim elements correspond to those used by Petitioner to reference the claim elements. *See* Pet. 2. We use them here for ease of reference, understanding, and consistency.

Claim 17:

[17pre] A method for processing signals from multiple users with raw digitized data, comprising:

[17a] performing parameter estimation of said raw digitized data;

[17b] grabbing a window of bits from said raw digitized data;

[17c] subtracting any known bits from said window of bits;

[17d] selecting a multi-user detector;

[17e] estimating unknown bits from said window of bits using said multi-user detector;

[17f] incrementing to a next window of bits;

[17g] repeating said steps of subtracting, selecting, estimating and incrementing until there are no more windows and outputting a set of symbol estimates.

Ex. 1001, 24:62–25:7.

E. Evidence relied on by Petitioner and Patent Owner

Petitioner relies on the following references.

Name	Reference	Exhibit
Onggosanusi	US 2006/0018410 A1	1005
Egnor	US 2005/0053173 A1	1006
Verdu	Sergio Verdu, “Multiuser Detection,” Cambridge University Press (1998)	1007

Petitioner also relies on the Declaration of Paul Min, PhD (Ex. 1003).

In its Preliminary Response, Patent Owner relies on the Declaration of Dr. Giuseppe Caire (Ex. 2001).

F. Asserted Grounds

Petitioner asserts that claims 1–18 are unpatentable on the following grounds:

Ground	Claim(s) Challenged	35 U.S.C. §⁵	Reference(s)/Basis
1	1–16	103(a)	Onggosanusi, Egnor
2	17, 18	103(a)	Egnor, Onggosanusi, Verdu

II. ANALYSIS

A. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art (“POSITA”) as of the time of the invention of the ’492 Patent “had at least a bachelor’s in EE/CE/CS, physics, or equivalent, and two years of experience with cellular telecommunications, radio-access network architectures, protocols and signal propagation in wireless networks. More education can supplement practical experience and vice versa.” Pet. 5 (citation omitted).

Patent Owner does not dispute Petitioner’s assertion. At this juncture, we adopt Petitioner’s definition. This definition appears to be consistent with what is reflected by the content of the applied prior art references. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (recognizing that the applied prior art may reflect an appropriate level of skill).

⁵ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284, 287–88 (2011), amended 35 U.S.C. §§ 102, 103, and 112. Because the ’492 Patent was filed before the effective dates of the relevant amendments, the pre-AIA versions of §§ 102, 103, and 112 apply.

B. Claim Construction

We use “the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” 37 C.F.R. § 42.100(b) (2024). The claim construction standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), is applicable.

Only those claim terms that are in controversy need to be construed, and only to the extent necessary to resolve the controversy. *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019).

I. “multi-user detector decision unit”

Claims 1 and 10 each recite “a multi-user detector decision unit.” Ex. 1001, 23:35, 24:15. Specifically, claim 1 recites “a multi-user detector decision unit coupled to said parameter estimator and said received signals; . . . said multi-user detector decision unit using decision criteria to determine a selected multiuser detector.” Ex. 1001, 23:35–40. Claim 10 similarly recites “a multi-user detector decision unit coupled to said parameter estimator and said received signals, wherein said multi-user detector decision unit selects a multi-user detector based upon at least one threshold.” *Id.* at 24:15–18.

Patent Owner contends that these terms should be construed according to the requirements of 35 U.S.C. § 112, sixth paragraph. Prelim Resp. 17–18. Patent Owner identifies the claimed functions for these two limitations as “using decision criteria to determine a selected multi-user detector” for claim 1 and “select[ing] a multi-user detector based upon at least one threshold” for claim 10. *See* Prelim. Resp. 17 & n.2; Ex. 2005, 73–74;

Williamson v. Citrix Online, LLC, 792 F.3d 1339, 1351 (Fed. Cir. 2015) (“Construing a means-plus-function claim term is a two-step process. The court must first identify the claimed function. . . . Then, the court must determine what structure, if any, disclosed in the specification corresponds to the claimed function.” (emphasis added)). Patent Owner then contends that the corresponding structure for both of these terms is:

a MUD decision unit 220 (or, alternatively, decision logic unit 520) configured to perform one or more of the several decision algorithms, e.g., the BER/User, SINR/Symbol, Filtered SINR/Symbol, Detected Amount/Symbol, Correlation Matrix Ratio/User, Correlation Matrix Eigenvalues, Computational Complexity, Number of Bits, Number of Users, and other algorithms disclosed at 8:12–18, 13:35–14:40, 15:3–21, 19:43–48, 19:56–62, and 20:41–49.

Prelim. Resp. 20–21. Petitioner initially contended that these terms should be accorded their plain meaning. Pet. 11. However, in the Preliminary Reply, Petitioner agrees to Patent Owner’s proposed construction. Prelim. Reply 1.

In support of this proposed construction, Patent Owner observes that the District Court for the Eastern District of Texas has previously reviewed the term in claim 1 of the ’492 Patent and concluded that this term was subject to Section 112, sixth paragraph. Prelim. Resp. 17–18 (citing *Collision Commc’ns Inc. v. Nokia Networks & Sols. Oy*, No. 2:21-cv-00308, slip op. at 74–75 (E.D. Tex. Aug. 31, 2022) (Ex. 2005)). The District Court adopted a construction essentially the same as that proposed by Patent Owner and agreed to by Petitioner. *Compare* Ex. 2005, 74, with Prelim. Resp. 20–21. While we are not bound by the District Court’s construction, our rules nonetheless obligate us to take it into consideration. *See* 37 C.F.R. § 42.100(b) (“Any prior claim construction determination concerning a term

of the claim in a civil action . . . that is timely made of record in the *inter partes* review proceeding will be considered.”); *cf. ParkerVision, Inc. v. Vidal*, 88 F.4th 969, 977–78 (Fed. Cir. 2023) (affirming Board’s claim construction notwithstanding prior inconsistent district court construction). On the record before us, we find the District Court’s analysis persuasive in this case.

In view of the parties’ agreement to adopt Patent Owner’s construction and the District Court’s persuasive analysis, we find that the “multi-user detector decision unit” terms in claims 1 and 10 are properly construed on the record before us to recite the functions “using decision criteria to determine a selected multi-user detector” for claim 1 and “select[ing] a multi-user detector based upon at least one threshold” for claim 10, both of which have the following corresponding structure:

a MUD decision unit 220 (or, alternatively, decision logic unit 520) configured to perform one or more of the several decision algorithms (e.g., the BER/User, SINR/Symbol, Filtered SINR/Symbol, Detected Amount/Symbol, Correlation Matrix Ratio/User, Correlation Matrix Eigenvalues, Computational Complexity, Number of Bits, Number of Users, and other algorithms) disclosed at 8:12–18, 13:35–14:40, 15:3–21, 19:43–48, 19:56–62, and 20:41–49 of the ’492 Patent.

2. *Other Terms*

No other terms require construction for purposes of this decision. *Realtime Data*, 912 F.3d at 1375.

C. *Legal Principles*

Petitioner bears the burden to demonstrate unpatentability, and that burden never shifts to Patent Owner. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). A claim is unpatentable under 35 U.S.C. § 103 if the differences between the claimed

subject matter and the prior art are such that the subject matter, as a whole, would have been obvious to a person having ordinary skill in the art to which said subject matter pertains. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations, including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) where in evidence, so-called secondary considerations, including commercial success, long-felt but unsolved needs, failure of others, and unexpected results. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

D. Ground 1: Onggosanusi and Egnor

1. Onggosanusi

Onggosanusi is a United States Patent Application Publication disclosing a multimode detector for use in a wireless multi-input multi-output (MIMO) system. Ex. 1005, code (57).

Figure 2 of Onggosanusi is reproduced below.

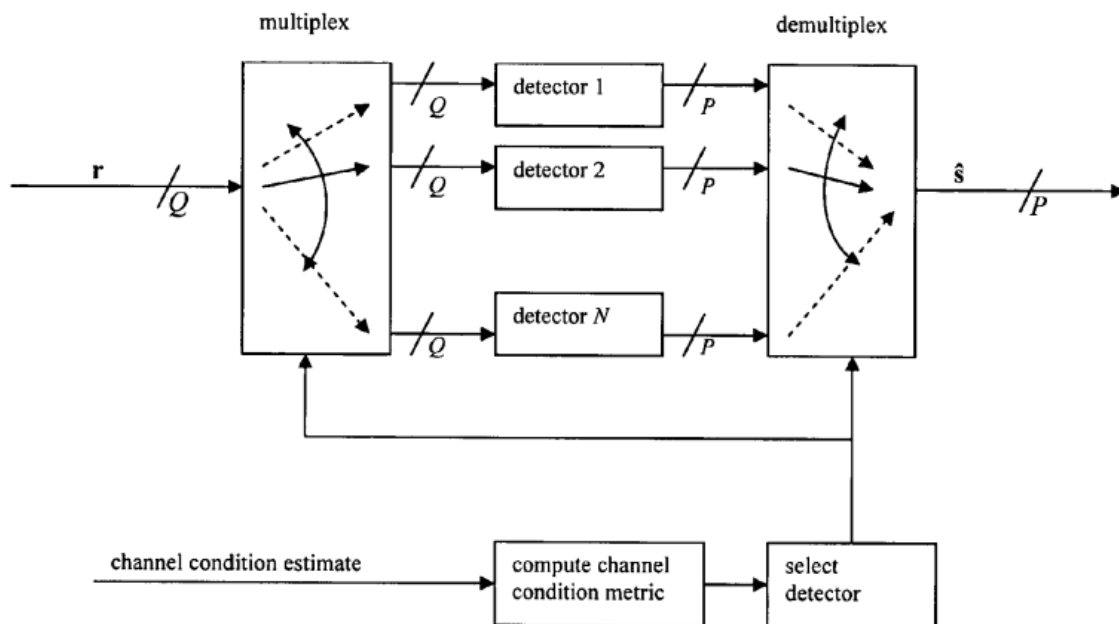


Figure 2 depicts Onggosanusi's multimode detector. A raw data signal "r" is received by a multiplexer. Ex. 1005 ¶¶ 14, 36. The multiplexer routes the raw input data to one of a plurality of detectors 1–N, based on a control input. *Id.* ¶¶ 36–38, 40. The selected detector processes the input signal to detect which source the input signal is coming from, and sends the processed signal to a demultiplexer. *Id.* The demultiplexer outputs the processed signal to a demodulator and decoder. *Id.* ¶ 21.

The control signal to the multiplexer and demultiplexer is computed by a channel condition metric block. Ex. 1005 ¶ 36. The channel condition metric block receives a channel condition estimate as an input, and computes a metric which indicates the level to which the channel is well-behaved or ill-conditioned. *Id.* ¶¶ 36–38. This metric is provided to a detector selector, which determines a detector to use based on the metric. *Id.* ¶¶ 14, 36. The detector selector controls the multiplexer and demultiplexer to direct the input signal to the proper detector and receive the processed signal from the proper detector. *Id.* ¶ 36.

2. *Egnor*

Egnor is a United States Patent Application Publication that discloses a multiuser detector which passes its output data to a bank of error correction decoders. Ex. 1006 ¶ 59.

3. *Ground 1: Claims 1–16*

Petitioner asserts a single ground of unpatentability for claims 1–16, relying on the combination of Onggosanusi and Egnor to allege that independent claims 1 and 10 would have been obvious. Pet. 4. Focusing on the "multi-user detector decision unit" limitations of claims 1 and 10, Petitioner contends that Onggosanusi teaches these limitations. Pet. 34–37, 47. Patent Owner disputes Petitioner's contention. Prelim. Resp. 21–24.

As we explain below, we find that Petitioner fails to sufficiently show a reasonable likelihood of success in establishing that Onggosanusi teaches or suggests these limitations. Petitioner does not rely on Egnor for these limitations. Therefore, Petitioner fails to show a reasonable likelihood of success in establishing that claims 1 and 10 would have been obvious over Onggosanusi and Egnor. Claims 2–9 and 11–16 depend from claims 1 and 10 respectively, and thus Petitioner likewise fails to show a reasonable likelihood of success that those dependent claims would have been obvious over Onggosanusi and Egnor. Therefore, we find that Petitioner fails to show a reasonable likelihood of success for Ground 1.

We focus our analysis on the “multi-user detector decision unit” limitations of claims 1 and 10. Claim 1 recites “a multi-user detector decision unit coupled to said parameter estimator and said received signals; . . . said multi-user detector decision unit using decision criteria to determine a selected multiuser detector.” Ex. 1001, 23:35–40. Claim 10 similarly recites “a multi-user detector decision unit coupled to said parameter estimator and said received signals, wherein said multi-user detector decision unit selects a multi-user detector based upon at least one threshold.” *Id.* at 24:15–18. As discussed above, we give both of these limitations the same construction, per the parties’ agreement.

Under the agreed-upon construction, the corresponding structure in the ’492 Patent is MUD decision unit 220 or decision logic unit 520 configured to perform at least one of several algorithms described in the ’492 Patent specification. Petitioner contends that Onggosanusi discloses two of “the **very same** algorithms [Patent Owner] identifies in the specification as corresponding structure for claim 1.” Prelim. Reply 1. We disagree.

The parties agree that the required algorithms are set forth at 8:12–18, 13:35–14:40, 15:3–21, 19:43–48, 19:56–62, and 20:41–49 of the '492 Patent. Prelim. Resp. 20–21; Prelim. Reply 1. These passages disclose a number of different algorithms, at least one of which must be used by the claimed invention (and thus must be taught by the asserted prior art, to show unpatentability). Petitioner relies on two of these algorithms, which it contends Onggosanusi teaches. The first is “a correlation matrix between the users,” and the second is an “eigendecomposition of the correlation matrix.”⁶ Prelim. Reply 1.

a) *“Correlation Matrix” Algorithm*

For the first algorithm, Petitioner contends that Onggosanusi discloses a function $f(H)$ which “determines the correlation between user signals within the H matrix and partitions the correlation matrix into thresholds for each MUD.” Prelim. Reply 1 (internal quotations omitted). Patent Owner, however, points out that the algorithm disclosed in the '492 Patent requires more than merely determining a correlation and partitioning a matrix into thresholds for each MUD. For example, the disclosed correlation matrix algorithm requires “comparing each diagonal term to the sum of the off diagonal terms.” Prelim. Sur-Reply 2 (citing Ex. 1001, 13:55–62). The entire “correlation matrix” algorithm recites the following:

Another technique for making the decision is to look at the correlation matrix between the users and comparing each diagonal term to the sum of the off diagonal correlation terms. If the ratio for a certain number of users is greater than a certain

⁶ Each of these two contentions appears to point to a threshold value, which is a data structure (i.e. a matrix or an eigendecomposition of a matrix) rather than an algorithm. Ex. 1001, 8:12–18. Nevertheless, we assume for purposes of this decision, without deciding, that each of these recitations is intended to refer to an algorithm for using or deriving the recited data structure.

threshold then a lower complexity MUD can be used. If the ratio is below that threshold then a higher complexity MUD can be used. If more than two types of MUD are used, then multiple thresholds can be set for each MUD.

Ex. 1001, 13:55–62.

The parties agree that the algorithm required by the multi-user detector decision units of claims 1 and 10 must be selected from those recited at the passages indicated above, which for the “correlation matrix” algorithm relied upon by Petitioner includes the “diagonal term” step noted by Patent Owner. Prelim. Reply 1; Prelim. Sur-Reply 1. The Petition fails to identify anything in Onggosanusi which correlates to the “diagonal term” algorithm step. Nor does the Petition identify anything in Onggosanusi that suggests the use of the “diagonal term” algorithm step.

Petitioner relies on its discussion of dependent claim 3 for its analysis of the “correlation matrix” algorithm it identifies as corresponding structure under the agreed-upon construction of this limitation of claims 1 and 10. Prelim. Reply 1 (citing Pet. 43–44). The Petition, however, merely contends that Onggosanusi discloses a matrix H , which is a “correlation matrix.” Pet. 43–44. This matrix is operated on by a function “ $f(H)$,” which has the purpose of determining correlations between the various channels which make up H . *Id.* In relevant part, Petitioner’s declarant repeats the Petition nearly verbatim. *See* Ex. 1003 ¶¶ 130–131.

Petitioner does not identify or discuss what specific function $f(H)$ performs, nor the steps that this function performs to determine these correlations. Thus, Petitioner fails to show that Onggosanusi discloses or suggests the step of comparing each diagonal term of the correlation matrix to the sum of the off-diagonal terms of the correlation matrix, as required by the “correlation matrix” algorithm described in the specification of the ’492

Patent. Thus, Petitioner fails to show a reasonable likelihood that Onggosanusi performs any of the algorithms required by the agreed-upon construction for this term.

Furthermore, Petitioner does not set forth any argument or identify with particularity any evidence from which we could conclude that there is a reasonable likelihood that Onggosanusi teaches or suggests structure that is identical or equivalent to the '492 Patent's MUD decision unit 220 or decision logic unit 520 configured to perform the disclosed correlation matrix algorithm. Accordingly, Petitioner has failed to meet its burden as to the correlation matrix algorithm.

b) “Eigendecomposition” Algorithm

For the second algorithm, Petitioner contends that Onggosanusi discloses an example of $f(H)$ that computes $H^H H$ and finds the eigenvalues of $H^H H$. Prelim. Reply 1 (citing Pet. 44). Petitioner contends that the calculation of eigenvalues is “an eigendecomposition of the correlation matrix H ,” which is all that is required by the agreed-upon claim construction. Prelim. Reply 1; Pet. 44.

As Patent Owner notes, however, the disclosed eigendecomposition algorithm requires more than mere calculation of eigenvalues. Prelim. Sur-Reply 2. Specifically, Patent Owner contends that the disclosed eigendecomposition algorithm requires the calculation of eigenvectors as well. *Id.* at 1 (citing Ex. 1001, 14:7–18). Furthermore, according to Patent Owner, this algorithm requires calculation and use of “all the eigenvalues

and all the eigenvectors” which are above a noise floor value for the correlation matrix. *Id.* at 2 (citing Ex. 1001, 13:55–62).⁷

We agree with Patent Owner. The common thread through the disclosed algorithm is that all of the eigenvalues in the eigendecomposition of the correlation matrix are used in the algorithm. Ex. 1001, 14:7–18. The complete algorithm recites:

The decision can be made by taking the eigendecomposition of the correlation matrix and looking at all the eigenvalues that are above the noise floor. If the first N eigenvalues are very close to one another and the eigenvectors associated with those eigenvalues all have the same N entries terms then use a lower complexity MUD. If there are any other regions of the eigenvalues that are basically equal and the eigenvalues have the same dominant terms or if there is any one eigenvector that has a dominant term and its eigenvector is above the noise floor then use a lower complexity MUD. If the eigenvalues and eigenvectors of the correlation matrix do not have these characteristics then use the highest complexity MUD.

Id.

In this algorithm, a first N of the eigenvalues are examined, and if they meet certain criteria, a lower complexity MUD detector is then used. Ex. 1001, 14:7–18. Alternatively, if any other regions of eigenvalues meet specified criteria, then a lower complexity MUD detector is used. *Id.*

Otherwise, the highest complexity detector is used. *Id.*

Petitioner merely contends that Onggosanusi’s function $f(H)$ computes the eigenvalues of $H^H H$. Pet. 44. Petitioner’s declarant again repeats the Petition nearly verbatim. *See* Ex. 1003 ¶ 132. Nowhere does

⁷ It appears that Patent Owner’s Sur-Reply intended to cite to Ex. 1001, 14:7–18 here, which passage recites the “eigendecomposition” algorithm, rather than repeating the prior citation to the “correlation matrix” algorithm.

Petitioner discuss whether, how, or where Onggosanusi discloses or suggests the computation of eigenvectors. Nor does Petitioner discuss whether, how, or where Onggosanusi discloses or suggests the particular way the eigenvalues are used as set forth in the '492 Patent algorithm required by the construction agreed to by the parties.

Specifically, Petitioner fails to show that Onggosanusi examines the first N eigenvalues to determine whether those eigenvalues meet criteria that would indicate that use of a lower complexity MUD detector was appropriate. Nor does Petitioner show that Onggosanusi looks at other regions of eigenvalues to determine whether a lower complexity MUD detector is appropriate. Nor does Petitioner show that Onggosanusi uses all of the eigenvalues in the eigendecomposition of the correlation matrix that are above a noise floor in making decisions as to which MUD detector to use. These are all steps of the eigendecomposition algorithm required by the claim construction the parties agreed to in this matter. Thus, Petitioner fails to show a reasonable likelihood that Onggosanusi discloses or suggests the same eigendecomposition algorithm as required by the agreed-upon construction for this term.

Furthermore, Petitioner does not set forth any argument or identify with particularity any evidence from which we could conclude that there is a reasonable likelihood that Onggosanusi teaches or suggests structure that is identical or equivalent to the '492 Patent's MUD decision unit 220 or decision logic unit 520 configured to perform the disclosed eigendecomposition algorithm. Accordingly, Petitioner has failed to meet its burden as to the eigendecomposition algorithm.

Accordingly, we find that Petitioner has failed to sufficiently show a reasonable likelihood of success in showing that claims 1 or 10 would have

been obvious over Onggosanusi in view of Egnor. Because claims 2–9 and 11–16 depend from claims 1 and 10 respectively, Petitioner likewise fails to establish a reasonable likelihood of success in showing that these claims would have been obvious over Onggosnausi in view of Egnor. Thus, we find that Petitioner fails to establish a reasonable likelihood of success as to Ground 1.

4. *Ground 2: Claims 17 and 18*

Petitioner alleges that claims 17 and 18 are unpatentable as obvious over Egnor in view of Onggosanusi and Verdu. Pet. 4. In view of our finding that Petitioner fails to show a reasonable likelihood of success as to Ground 1, we exercise our discretion under 35 U.S.C. § 314(a) to deny institution of an *inter partes* review.

The Board is never required to institute an *inter partes* review. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”). “Even when a petitioner demonstrates a reasonable likelihood of prevailing with respect to one or more claims, . . . institution of review remains discretionary.” *Chevron Oronite Co. v. Infineum USA L.P.*, IPR2018-00923, Paper 9 at 10 (PTAB Nov. 7, 2018) (informative) (citing *SAS Inst. v. Iancu*, 138 S. Ct. 1348, 1356 (2018); *Harmonic*, 815 F.3d at 1367). Where a Petition presents a reasonable likelihood of success as to only a small number of the challenged claims, the Board has the discretion to decline to institute review, because instituting a full review on all challenged claims may be an inefficient use of the Board’s limited resources. *See, e.g., Deeper, UAB v. Vexilar, Inc.*, IPR2018-01310, Paper 7 at 42–43 (PTAB Jan. 24, 2019) (informative) (denying institution where a petitioner demonstrated a reasonable likelihood of success on only two out of twenty-

three claims); *Chevron Oronite*, Paper 9 at 10–11 (denying institution where a petitioner demonstrated a reasonable likelihood of success on only two out of twenty claims).

Of the eighteen challenged claims, we have found that Petitioner failed to establish a reasonable likelihood of success as to sixteen of those claims. This leaves a single independent claim (claim 17) and a single dependent claim (claim 18) remaining for consideration. Even were we to conclude that Petitioner had established a reasonable likelihood of success as to claims 17 and 18, this would leave at most two claims subject to a single ground upon which such a showing had been made, out of eighteen challenged claims. Based on the particular circumstances of this case, it would be inefficient for the Board to expend resources on a full review of all eighteen challenged claims, where Petitioner has failed to establish even a reasonable likelihood of success as to the vast majority of those claims. Accordingly, we need not, and do not, take any position as to Petitioner’s showing on Ground 2 but instead exercise our discretion to deny review.

III. CONCLUSION

For the foregoing reasons, we determine that Petitioner has not shown a reasonable likelihood that it would prevail in showing that claims 1–16 of the ’492 Patent are unpatentable. We further determine that it would be an inefficient use of the Board’s resources to institute where only two claims even potentially met the reasonable likelihood standard. Accordingly, we decline to institute an *inter partes* review.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that pursuant to 35 U.S.C. § 314, the Petition is denied, and no *inter partes* review is instituted.

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