Trials@uspto.gov
571-272-7822

Paper 21
Date: October 17, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SHANGHAI HONGENE BIOTECH CORP.,
Petitioner,

v.

CHEMGENES CORP.,
Patent Owner.

IPR2023-00875
Patent 8,309,707 B2

Before JOHN G. NEW, ZHENYU YANG, and CYNTHIA M. HARDMAN, *Administrative Patent Judges.*

YANG, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

Granting Petitioner's Motion to Seal (Paper 19)
37 C.F.R. §§ 42.14, 42.54

I. INTRODUCTION

Shanghai Hongene Biotech Corp. ("Petitioner") filed a Petition (Paper 1, "Pet.") seeking *inter partes* review of claims 1 and 2 of U.S. Patent No. 8,309,707 B2 (Ex. 1001, "the '707 patent"). ChemGenes Corp. ("Patent Owner") did not file a Preliminary Response. We instituted trial to review the challenged claims. Paper 6.

After institution, Patent Owner filed a Response (Paper 10, "PO Resp.") and a Motion to Amend Claims (Paper 11, "MTA"). In the MTA, Patent Owner proposed to replace claims 1 and 2 with substitute claims 4 and 5. MTA 1–2. Petitioner filed an Opposition to Patent Owner's MTA (Paper 13) and a Reply to Patent Owner's Response (Paper 14, "Reply").

After we entered Preliminary Guidance on Patent Owner's Motion to Amend (Paper 15), Patent Owner requested authorization to withdraw its MTA (Ex. 3003). We granted that request. Paper 17. Thereafter, Patent Owner filed a Sur-reply to Petitioner's Reply (Paper 20, "Sur-reply").[1]

The Board has jurisdiction under 35 U.S.C. § 6 and issues this Final Written Decision pursuant to 35 U.S.C. § 318 and 37 C.F.R. § 42.73. For the reasons provided below, we find Petitioner has shown, by a preponderance of the evidence, the unpatentability of claims 1 and 2.

A. Related Matters

According to the parties, Patent Owner asserted the '707 patent against Petitioner in Case No. 1-22-cv-10290 (D. Mass.) but later voluntarily dismissed the district court action. Pet. vii; Paper 4, 2.

[1] Paper 20 is a redacted version of the Sur-reply. Patent Owner originally filed the Sur-reply under seal. *See* Paper 18.

Petitioner also filed IPR2023-00490 and IPR2023-00862, challenging two other patents asserted in the district court action. Pet. vii–viii; Paper 4, 2. In IPR2023-00490, we determined that claims 1–5 of U.S. Patent 9,884,885 are unpatentable. IPR2023-00490, Paper 35. In a concurrently entered decision, we determine that claims 1 and 2 of U.S. Patent 8,541,569 are unpatentable. IPR2023-00862, Paper 21.

B. The '707 Patent

The '707 patent "relates to the synthesis of novel RNA monomer phosphoramidites, and corresponding solid supports that are suitable for a novel method of RNA oligonucleotide synthesis in reverse 5′→3′ direction." Ex. 1001, 1:24–27.

The '707 patent explains that, at the time of its alleged invention, defined sequence RNA synthesis in the 3′→5′ direction was well established. *Id.* at 1:35–54. According to the '707 patent, however, "the synthesis of RNA in the reverse direction (5′-3′ direction) ha[d] not been achieved." *Id.* at 1:55–57.

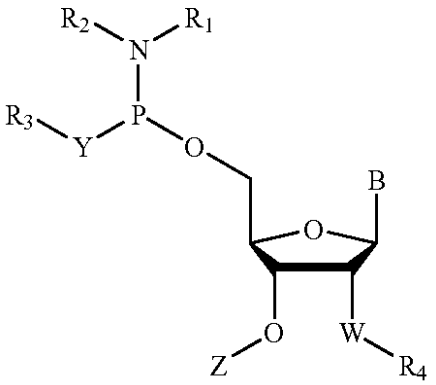
The '707 patent discloses reverse RNA monomer phosphoramidites for RNA synthesis in 5′→3′ direction, which leads to "very clean oligo synthesis that allows for the introduction of various modifications at the 3'-end cleanly and efficiently." *Id.* at 8:34–39.

C. Challenged Claims

We reproduce below the parts of claims 1 and 2 that are relevant to our analysis.

1. A phosphoramidite having formula (1),

Formula (1)



where,

Y is an oxygen atom or a sulfur atom;

W is selected from the group consisting of an oxygen diradical, a N—H diradical and a fluorine radical, and R_4 is selected so that,

. . .

if W is a N—H diradical, then R_4 is of the form R_5^x where x is selected from the group consisting of fluorenylmethyloxycarbonyl (Fmoc), trifluoroacetyl, acetyl, alkanoyl, and aroyl; and

. . .

B is selected from the group of nucleoside base radicals consisting of . . . and 1-uracilyl-;

. . .

Z is a protecting group selected from the group consisting of dimethoxytriphenylmethyl (DMT), monomethoxytriphenylmethyl (MMT) and trimethoxytriphenylmethyl (TMT);

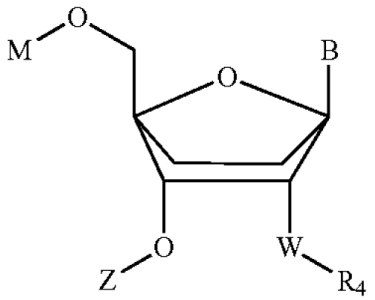
R_1 is an alkyl or aryl radical;

R_2 is an alkyl or aryl radical; and,

R_3 is a cyanoethyl radical, alkyl radical or aryl radical.

2. A derivatized nucleoside having a structure of formula 2,

Formula (2)



where,

M is a hydrogen radical or a linker;

if M is a linker, then it is represented by the formula Y—C(O) and, optionally, connected to a solid support suitable for oligonucleotide synthesis, wherein

Y is a chain of between 2 and 20 carbons, selected from the group consisting of alkyl, alkenyl, cycloalkyl, aryl, and aralkyl, in a hydrocarbyldiradical moiety, optionally comprising intervening —O—, —S—, —$S(O)_2$—, —C(O)—, and —NR_6—, where R_6 is a hydrogen radical, or a substituted C_1 to C_{20} alkyl or a substituted aralkyl;

W is selected from the group consisting of an oxygen diradical, a N—H diradical and a fluorine radical, and R_4 is selected so that,

. . .

if W is a N—H diradical, then R_4 is of the form R_5^x where x is selected from the group consisting of fluorenylmethyloxycarbonyl (Fmoc), trifluoroacetyl, acetyl, alkanoyl, and aroyl;

. . .

B is selected from the group of nucleoside base radicals consisting of . . . and 1-uracilyl-;

. . .

Z is a protecting group selected from the group consisting of dimethoxytriphenylmethyl (DMT),

monomethoxytriphenylmethyl (MMT) and
trimethoxytriphenylmethyl (TMT).

Ex. 1001, 33:48–36:15.

D. Instituted Challenges to Patentability

We instituted trial to determine whether the challenged claims are unpatentable based on the following grounds:

Claim Challenged	35 U.S.C. §	Reference(s)/Basis
1	102(b)	The '696 patent[2]
2	102(b)	The '696 patent

Petitioner relies on the declaration of Phil S. Baran, Ph.D., as support for its Petition. Ex. 1003. Patent Owner relies on the Declaration of Patrick J. Hrdlicka, Ph.D., to support the Patent Owner Response. Ex. 2001.

II. ANALYSIS

A. Principles of Law

To prevail in this *inter partes* review, Petitioner "shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence." 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

To show anticipation under 35 U.S.C. § 102, each and every claim element, arranged as in the claim, must be disclosed in a single piece of prior art. *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359 (Fed. Cir. 2008). For a claim directed to a genus, if a prior art reference discloses a species falling within the claimed genus, the species anticipates the genus. *In re Slayter*, 276 F.2d 408, 411 (CCPA 1960); *see also Fresenius USA, Inc. v. Baxter Int'l, Inc.*, 582 F.3d 1288, 1298 (Fed. Cir. 2009) (stating that when a claim

[2] US Patent No. 5,869,696, issued Feb. 9, 1999 (Ex. 1014, "the '696 patent").

element is written in Markush form, "the entire element is disclosed by the prior art if one alternative in the Markush group is in the prior art").

We analyze the instituted grounds of unpatentability in accordance with these principles.

B. Claim Construction

In an *inter partes* review, we construe a claim term "using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. [§] 282(b)." 37 C.F.R. § 42.100(b) (2020). Under that standard, the words of a claim "are generally given their ordinary and customary meaning," which is "the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). On this record and for purposes of this Decision, we see no need to address the construction of any claim term.

C. Level of Ordinary Skill in the Art

Petitioner contends that, as of the earliest possible priority date of the '707 patent,

> a person of ordinary skill in the art ("POSA") would have had a Ph.D. (or equivalent degree) in organic or medicinal chemistry, and two to three years of post-graduate work experience in medicinal chemistry, synthetic organic chemistry, and nucleic acid chemistry, including the development of oligonucleotide therapeutics, diagnostics, or building blocks.

Pet. 16 (citing Ex. 1003 ¶ 20).

Alternatively, Petitioner proposes that an individual holding a Bachelor's or Master's degree in organic chemistry or medicinal chemistry, "who had extensive work experience in these fields, and who had gained a thorough understanding of the development of nucleic acid-based materials, would also have qualified as a POSA." *Id.*

Patent Owner argues that a POSA would have had a Ph.D. (or equivalent degree) in organic chemistry, who, either during his or her Ph.D. studies, focused on, or has at least two to three years of post-graduate work experience in, "the development and syntheses of nucleosides, nucleotides, and nucleic acids, including, but not limited to, the syntheses of oligonucleotides through solid phase oligonucleotide synthesis ('SPOS') pursuant to P(III) chemistry." PO Resp. 21. Alternatively, Patent Owner proposes that someone with a lesser degree but more (at least five years) extensive work experience in these fields would also have qualified as a POSA. *Id.*

The parties' proposed definitions of the level of ordinary skill, although different facially, are similar substantively. For example, both parties argue that a POSA would have high levels of skill, with advanced degrees and/or extensive work experience in organic chemistry.[3] *See* Pet. 16; PO Resp. 21. In addition, Petitioner contends that a POSA would have had experience in the development of oligonucleotide building blocks. Pet. 16. Similarly, Patent Owner asserts that a POSA would have had education

[3] Although Patent Owner proposes deleting "medicinal" chemistry from Petitioner's definition, it states that "would not exclude medicinal or other chemists so long as the chemist in question met the [other] requirements." PO Resp. 22 (citing Ex. 2001 ¶ 64).

and/or experience in "the development and syntheses of nucleosides, nucleotides, and nucleic acids." PO Resp. 21.

After considering the parties' arguments and the prior art, we determine that a POSA would have had a Ph.D. (or equivalent degree) in organic chemistry or medicinal chemistry, with at least two to three years of post-graduate work experience in the development and syntheses of nucleosides, nucleotides, and nucleic acids, including, but not limited to, the syntheses of oligonucleotides through solid phase oligonucleotide synthesis. In addition, an individual with a Bachelor's or Master's degree and at least five years of work experience in these fields also would qualify as a POSA.

Patent Owner contends that Petitioner's declarant, Dr. Baran, does not have significant background in P(III) chemistry. *Id.* at 19; Sur-reply 12–13. According to Patent Owner, Dr. Baran published only about a dozen papers that relate to oligonucleotide synthesis, and the focus of those papers appears to be on P(V) chemistry, which is fundamentally different from P(III) chemistry. PO Resp. 19–20; Sur-reply 12–13. Although it does not challenge Dr. Baran's qualification to provide opinion in this proceeding, Patent Owner asserts that "Dr. Baran's lack of experience in P(III) synthesis[] should be strongly considered" in our evaluation of the weight of Dr. Baran's testimony. Sur-reply 13.

Patent Owner's argument that Dr. Baran is principally experienced in P(V) chemistry presupposes that experience indicates an ignorance of P(III) chemistry. We do not find this position consistent with the breadth of Dr. Baran's experience as indicated by his Curriculum Vitae. *See* Ex. 1003, 50–105. We weigh the testimonies of both Dr. Baran and Dr. Hrdlicka,

against the cumulative weight of the evidence of record in assessing their credibility and probative value.

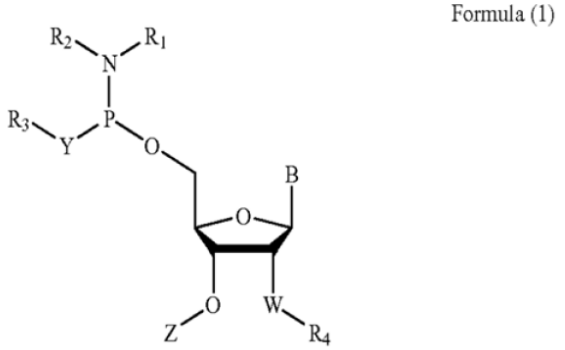
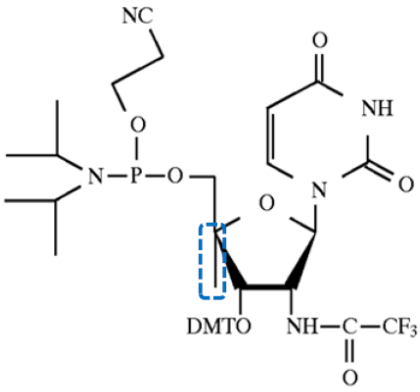
D. Disclosure of the '696 Patent

The '696 patent discloses "[u]niversal solid support oligonucleotide synthesis reagents, oligonucleotide synthesis processes, and reagents for cleaving oligonucleotides from solid supports." Ex. 1014, Abstract. Specifically, it discloses the synthesis of 2′-trifluoroacetamido-3′-O-(4,4′-dimethoxytrityl)-2′-deoxyuridine-5′-succinate in Example 2 (*id.* at 12:1–13:20) and the synthesis of 2′-Trifluoroacetamido-3′-O-(4,4′-dimethoxytrityl)-2′-deoxyuridine-5′-O-(N,N′-diisopropyl)-β-cyanoethyl-phosphoramidite in Example 3 (*id.* at 13:23–67).

E. Alleged Anticipation of Claim 1

Petitioner asserts that the '696 patent anticipates claim 1. Pet. 21–29. After reviewing the entire record developed at trial, and as explained below, we determine that Petitioner has shown, by a preponderance of the evidence, that the '696 patent anticipates claim 1.

Claim 1 is directed to a genus of compounds. Petitioner asserts that the '696 patent discloses a species of claim 1 in Example 3 as 2′-Trifluoroacetamido-3′-O-(4,4′-dimethoxytrityl)-2′-deoxyuridine-5′-O-(N,N′-diisopropyl)-β-cyanoethyl-phosphoramidite. Pet. 21–29 (citing Ex. 1003 ¶¶ 74–88). Petitioner provides the following comparison:

The '707 Patent, Claim 1	The '696 Patent, Example 3
Formula (1) 	

The figure above shows the side-by-side comparison of formula (1) of claim 1 with the compound of the '696 patent's Example 3. *Id.* at 23.

Petitioner argues that the compound of the '696 patent's Example 3 is a species of claim 1 where in formula (1), Y is an oxygen atom, W is a N-H diradical, R_4 is trifluoroacetyl, B is 1-uracilyl- nucleoside base radical, Z is a DMT protecting group, R_1 is an alkyl radical (specifically an isopropyl radical), R_2 is an alkyl radical (specifically an isopropyl radical), and R_3 is a cyanoethyl radical.[4] *Id.* at 21–28.

Patent Owner does not dispute Petitioner's anticipation challenge of claim 1. *See* PO Resp. 26–27; Sur-reply 14. Instead, Patent Owner contends that the challenge to claim 1 is moot subject to the MTA. PO Resp. 26–27. But Patent Owner has withdrawn its MTA. Ex. 3003. As we stated, the MTA

[4] Petitioner argues the vertical line (in the blue rectangle in the figure) extending downward from the 4′ carbon of the compound of the '696 patent's Example 3 "does not denote a methyl group." Pet. 24. Petitioner contends that the chemical name of Example 3's compound "does not reflect a methyl group (or any other substituent) on the 4′ carbon." *Id.* (citing Ex. 1003 ¶ 76, which in turn, cites Ex. 1014, 13:27–29). On this record, we find Petitioner's argument on this point persuasive.

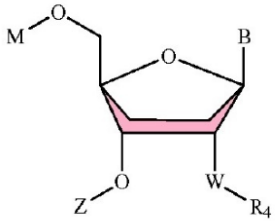
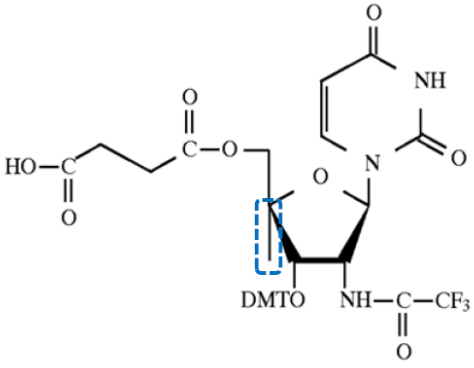
and related papers "have no further effect" upon the course of this proceeding. Paper 17, 2–3.

After reviewing the record, we find Petitioner's analysis persuasive and adopt it as our own. *See* Pet. 21–29. Thus, we determine Petitioner demonstrates by a preponderance of the evidence that the '696 patent, because of its disclosure of the compound of Example 3, anticipates claim 1.

F. Alleged Anticipation of Claim 2

Petitioner asserts that the '696 patent anticipates claim 2. Pet. 29–37. After reviewing the entire record developed at trial, and as explained below, we determine that Petitioner has shown, by a preponderance of the evidence, that the '696 patent anticipates claim 2.

Claim 2 is directed to a genus of compounds. Petitioner asserts that the '696 patent discloses a species of claim 1 in Example 2 as 2′-Trifluoroacetamido-3′-O-(4,4′-dimethoxy-trityl)-2′-deoxyuridine-5′-succinate. Pet. 29–38 (citing Ex. 1003 ¶¶ 89–105). Petitioner provides the following comparison:

The '707 Patent, Claim 2	The '696 Patent, Example 2
Formula (2) 	

The figure above shows the side-by-side comparison of formula (2) of claim 2 with the compound of the '696 patent's Example 2. *Id.* at 32.

Petitioner points out that "in Formula (2), the lower portion of the pentagon has normal lines without the space between them (shaded pink above) filled in to make thicker lines." *Id.* "Despite this omission," Petitioner asserts, a person of ordinary skill in the art "would have understood the pentagon in Formula (2) to represent ribose, not a bridged bicyclic molecule." *Id.* (citing Ex. 1003 ¶ 92 n.13, which in turn, cites Ex. 1001, 13:1–13, Structure (15)).

Petitioner argues that the compound of the '696 patent's Example 2 is a species of claim 2 where in formula (2), M is a succinate linker "represented by the formula Y—C(O) in a hydrocarbyl diradical, wherein Y is an alkyl chain having 2 carbons, i.e., ethyl . . . and further comprises an intervening —C(O)—," W is a N—H diradical, R_4 is trifluoroacetyl, B is 1-uracilyl- nucleoside base radical, and Z is a DMT protecting group.[5] *Id.* at 33–37.

Patent Owner does not dispute Petitioner's anticipation challenge of claim 2. *See* PO Resp. 27–28; Sur-reply 14. Instead, Patent Owner contends that the challenge to claim 2 is moot subject to the MTA. PO Resp. 26–27.

---

[5] Petitioner argues the vertical line (in the blue rectangle in the figure of Example 2) extending downward from the 4′ carbon of the compound of the '696 patent's Example 2 "does not denote a methyl group." Pet. 32. Petitioner contends that the chemical name of Example 2 compound "does not reflect a methyl group (or any other substituent) on the 4′ carbon." *Id.* at 32–33 (citing Ex. 1003 ¶ 93, which in turn, cites Ex. 1014, 12:3–5). On this record, we find Petitioner's argument on this point persuasive. We note that the Petition misstates that paragraph 93 of Dr. Baran's Declaration cites Exhibit 1014, 13:27–29. Paragraph 93, in fact, correctly cites Exhibit 1014, 12:3–5, for the chemical name of the compound in Example 2.

But Patent Owner has withdrawn its MTA. Ex. 3003. As we stated, the MTA and related papers "have no further effect" upon the course of this proceeding. Paper 17, 2–3.

After reviewing the record, we find Petitioner's analysis persuasive and adopt it as our own. *See* Pet. 29–37. Thus, we determine Petitioner demonstrates by a preponderance of the evidence that the '696 patent, because of its disclosure of the compound of Example 2, anticipates claim 2.

III. MOTION TO SEAL

Petitioner filed a Motion to Seal. Paper 19 ("Motion" or "Mot."). With the Motion, Petitioner filed a Protective Order that deviates from the Board's default protective order. Mot. 6; Exs. 1029 (clean copy), 1030 (showing marked-up comparison). According to Petitioner, Patent Owner does not oppose the entry of the proposed protective order. Mot. 6. The Protective Order (Ex. 1029) is hereby entered. It governs the conduct of the proceeding unless otherwise modified.

There is a strong public policy for making all information filed in an *inter partes* review open to the public, especially because the proceeding determines the patentability of claims in an issued patent and, therefore, affects the rights of the public. Generally, all papers filed in an *inter partes* review shall be made available to the public. *See* 35 U.S.C. § 316(a)(1); 37 C.F.R. § 42.14. Our rules, however, "aim to strike a balance between the public's interest in maintaining a complete and understandable file history and the parties' interest in protecting truly sensitive information." Patent Trial and Appeal Board Consolidated Trial Practice Guide 19

(November 2019) ("TPG").[6] Thus, a party may move to seal certain information (37 C.F.R. § 42.14); but only "confidential information" is protected from disclosure (35 U.S.C. § 326(a)(7)). Confidential information means trade secret or other confidential research, development, or commercial information. 37 C.F.R. § 42.2.

The standard for granting a motion to seal is "for good cause." 37 C.F.R. § 42.54(a). The party moving to seal bears the burden of proof and must explain why the information sought to be sealed constitutes confidential information. *Id.* § 42.20(c).

Petitioner seeks to seal portions of the Sur-Reply as well as Exhibits 2048 and 2049.[7] Mot. 2. According to Petitioner, these files contain its confidential information. *Id.* at 2–4. Petitioner proposes redacting the files and summarizes the nature of the proposed redaction. *Id.* at 5–6. Patent Owner has since filed the redacted version of the Sur-Reply as well as Exhibits 2048 and 2049.

Upon review of Petitioner's Motion and the proposed redactions, we are persuaded that good cause exists to seal portions of the Sur-Reply as well as Exhibits 2048 and 2049.

Petitioner also filed the Petition (Paper 1), Petitioner's Power of Attorney (Paper 2), the Opposition to Patent Owner's MTA (Paper 13), the Reply to Patent Owner's Response (Paper 14), and the Motion to Seal

---

[6] *Available at* https://www.uspto.gov/TrailPracticeGuideConsolidated.

[7] Patent Owner originally also filed Exhibits 2046 and 2047 under seal. Petitioner states that those documents "can be made publicly available." Mot. 2. Patent Owner has since filed Exhibits 2046 and 2047 as public documents. Thus, we will expunge Exhibits 2046 and 2047 originally filed under seal.

(Paper 19), as well as Exhibits 1001–1030 as "Board and Parties Only" with no corresponding motion to seal. If Petitioner wishes for any of these Papers and Exhibits to remain sealed, Petitioner should file a motion to seal and explain in detail what good cause supports granting the motion. In the absence of such a motion, at the expiration of ten business days from the date of this Decision, the entirety of the Petition (Paper 1), Petitioner's Power of Attorney (Paper 2), the Opposition to Patent Owner's MTA (Paper 13), the Reply to Patent Owner's Response (Paper 14), and the Motion to Seal (Paper 19), as well as Exhibits 1001–1030 will be made available to the public.

IV. CONCLUSION[8]

After reviewing the entire record and weighing evidence offered by both parties, we determine that Petitioner has met its burden to show, by a preponderance of the evidence, that the '696 patent anticipates claims 1 and 2.

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

In summary:

Claims	35 U.S.C. §	References	Claims Shown Unpatentable	Claim(s) Not Shown Unpatentable
1	102	The '696 patent	1	
2	102	The '696 patent	2	
Overall Outcome			1, 2	

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that Petitioner has shown, by a preponderance of the evidence, that claims 1 and 2 of the '707 patent are unpatentable;

FURTHER ORDERED that Petitioner's Motion to Seal is granted;

FURTHER ORDERED that Petitioner may, within five business days of this Decision, file an appropriate motion to seal as instructed in this Decision; 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:

Jeremy Edwards
Raymond Chan
Xiaofan Yang
Jack Shaw
PROCOPIO, CORY, HARGREAVES & SAVITCH, LLP
jeremy.edwards@procopio.com
raymond.chan@procopio.com
frank.yang@procopio.com
jack.shaw@procopio.com

FOR PATENT OWNER:

Daniel Shores
Joseph Hynds
Aydin Harston
Melissa Santos
ROTHWELL, FIGG, ERNST & MANBECK, P.C.
dshores@rfem.com
jhynds@rfem.com
aharston@rfem.com
msantos@rfem.com