

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC.,
Petitioner,

v.

CONSTELLATION DESIGNS, LLC,
Patent Owner.

IPR2023-00320
Patent 11,019,509 B1

Before MIRIAM L. QUINN, BRENT M. DOUGAL, and
MICHAEL T. CYGAN, *Administrative Patent Judges*.

CYGAN, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. *Background and Summary*

Petitioner, LG Electronics Inc., requests that we institute an *inter partes* review challenging the patentability of claims 3–7, 13–17, and 24–28 (the “challenged claims”) of U.S. Patent 11,019,509 B1 (Ex. 1001, “the ’509 patent”). Paper 3 (“Petition” or “Pet.”). Patent Owner, Constellation Designs, LLC, argues that Petitioner’s request is deficient and should not be granted. Paper 7 (“Preliminary Response” or “Prelim. Resp.”). Patent Owner has cancelled claims 3–5, 13–15, and 24–26 by statutory disclaimer. Ex. 2024.

Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we deny the Petition and do not institute an *inter partes* review.

B. *Related Matters*

The parties identify the following related district court litigation: *Constellation Designs, LLC v. LG Electronics Inc. et al.*, No. 2:21-cv-00448 (E.D. Tex.). Pet. 81; Paper 5, 1. Patent Owner also identifies the following related *inter partes* reviews: IPR2022-01482, IPR2022-01549, IPR2023-00228, IPR2023-00229, and IPR2023-00319. Paper 5, 1–2.

C. *The ’509 Patent*

The ’509 patent is titled “Receivers Incorporating Non-Uniform Constellations With Overlapping Constellation Point Locations.” Ex. 1001, code (54). The ’509 patent issued from Application Serial No. 16/728,384, filed on December 27, 2019, and claims priority through a series of

continuation applications to Provisional Application No. 60/933,319, filed on June 5, 2007. *Id.* at codes (21), (22), (60), (63).

The '509 patent describes a communication system in which a transmitter transmits a signal over a channel to a receiver using a predetermined modulation scheme, which is decoded at the receiver. *Id.* at 5:53–54. The receiver includes a demodulator, which demodulates the signals to obtain symbol or bit likelihoods to a demapper that provides the likelihoods to a decoder, which decodes the encoded bit stream. *Id.* at Fig. 3, 5:54–60. The coding scheme may be a capacity approaching code such as a turbo code or an LDPC code. *Id.* at 5:43–44. The mapper/demapper relies upon mapping of coded bits to a symbol within a geometrically distributed signal constellation. *Id.* at 5:46–49, 5:55–58.

The constellation, which describes the possible symbols that can be transmitted, may be designed to optimize a specified capacity through an iterative process. *Id.* at 1:42–44, 7:46–49. A procedure for such optimization is described as follows:

The following procedure could be used to determine the target capacity that includes some margin on top of the user rate. First, the code (e.g. LDPC or Turbo) can be simulated in conjunction with a conventional equally spaced constellation. Second, from the simulation results the actual SNR of operation at the required error rate can be found. Third, the capacity of the conventional constellation at that SNR can be computed. Finally, a geometrically shaped constellation can be optimized for that capacity.

Id. at 7:59–67.

D. Illustrative Claim

The challenged claims are all dependent claims and depend, directly or indirectly, from independent claims 1, 11, and 21, respectively. Claim 6 depends from claim 1 and is illustrative:

Claim 6 recites:

The communication system of claim 1, wherein:

the non uniform symbol constellation is selected from a plurality of unequally spaced symbol constellations; and

each of the plurality of unequally spaced symbol constellations is characterized by the assignment of labels and spacing of the constellation points such that each of the plurality of unequally spaced symbol constellations is capable of providing greater parallel decoding capacity when operated at a symbol constellation operating SNR than the other plurality of unequally spaced symbol constellations when operated at the same SNR.

Ex. 1001, 15:51–62. Claims 16 and 27 are substantially similar. *Id.* at 18:49–59, 22:3–13.

E. Evidence

Petitioner’s grounds of unpatentability rely on the following evidence:

Name	Non-Patent Literature	Author	Exhibit
ATSC327	<i>ATSC Recommended Practice: Guidelines for the Physical Layer Protocol (A/327)</i> , 8 Oct. 2018	Advanced Television Systems Committee	1028

Name	Patent Document	Exhibit
Barsoum or the ’777 patent	US Patent 7,978,777 (July 12, 2011)	1027

F. Asserted Grounds

Petitioner asserts the following grounds of unpatentability (Pet. 1–2), supported by the declaration of Dr. Bertrand Hochwald (Ex. 1003):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
3–7, 13–17, 24–28	103	Barsoum, ATSC327

II. ANALYSIS

A. *Legal Standards*

Petitioner bears the burden to demonstrate unpatentability. *Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). For purposes of institution, we determine whether the information presented in the Petition shows a reasonable likelihood that Petitioner would prevail in establishing that at least one of the challenged claims would have been obvious over the proposed combinations of prior art. *See* 35 U.S.C. § 314(a).

A claim is unpatentable as obvious if “the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting 35 U.S.C. § 103(a)). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence, objective indicia of nonobviousness. *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

We apply these principles to the Petition’s challenges.

B. *Level of Ordinary Skill in the Art*

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Id.* at 13, 17. Petitioner asserts that a person of ordinary skill in the art

would have had at least a Master’s degree in an academic area emphasizing electrical engineering or a similar discipline, and at

least two years of experience in the field working with, teaching, or researching communication systems including the use of constellations in transmitting signals between devices. [Ex.]1003, ¶¶[21–23]. Superior education could compensate for a deficiency in work experience, and *vice-versa*. *Id.*

Pet. 26.

Though Patent Owner makes arguments with reference to “a person of ordinary skill,” Patent Owner does not directly address or contest Petitioner’s level of skill. *See* Prelim. Resp. We are persuaded, on the present record, that Petitioner’s proposal is consistent with the problems and solutions in the ’509 patent and prior art of record. We adopt Petitioner’s definition of the level of skill for the purposes of this Decision.

C. *Claim Construction*

In *inter partes* review, we construe claims 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), 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) (2022).

Petitioner asserts that no terms require express construction. Pet. 26. Patent Owner does not argue that terms in the challenged claims should be construed. We determine that no terms need to be construed at this time. *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))).

D. Analysis of the Challenged Claims

The Petition argues that dependent claims 3–7, 13–17, and 24–28 are obvious over the combination of Barsoum and ATSC327. Pet. 26. The ’509 patent states that it is, via a chain of continuations, a continuation of the ’777 patent (aka Barsoum). Ex. 1001 code (63). Petitioner challenges this claim to priority, arguing that features of the challenged claims do not have written description support in Barsoum. Pet. 3.

Patent Owner disagrees, arguing that both applied references are only prior art to the ’509 patent if the ’509 patent cannot claim priority to Barsoum. Prelim. Resp. 41. Patent Owner has cancelled claims 3–5, 13–15, and 24–26 by statutory disclaimer. Ex. 2024. The disclaimer eliminates claims 3–5, 13–15, and 24–26 from the ’509 Patent, leaving the patent as if those claims never existed. *See* 35 U.S.C. § 253 (“disclaimer . . . shall thereafter be considered as part of the original patent”); *Sanofi-Aventis U.S., LLC v. Dr. Reddy’s Labs., Inc.*, 933 F.3d 1367, 1373 (Fed. Cir. 2019) (disclaimer leaves the patent “as though the disclaimed claim(s) had ‘never existed’”); 37 C.F.R. § 42.107(e) (“No *inter partes* review will be instituted based on disclaimed claims”). Therefore, the remaining claims under contention in the Petition are claims 6–7, 16–17, and 27–28.

For the reasons expressed below, we determine that Petitioner has not established a reasonable likelihood that at least one claim of the ’509 patent is unpatentable.

1. Written Description Support

Petitioner argues that claims 6, 16, and 27¹ lack written description support in Barsoum for the “relative relationship between a first group of

¹ Both parties refer to claim 26, but cite to language of claim 27.

unequally spaced symbol constellations to a second group of unequally spaced symbol constellations when the two groups are operated at the same SNR.” Pet. 15 (emphasis omitted). Petitioner argues that Barsoum “only describes determining a relative relationship between *a* geometrically shaped (i.e., unequally spaced) constellation and a constellation optimized for $d_{\min}$.” *Id.* (citing Ex. 1027, 6:14–20, 2:56–63; Ex. 1003 ¶ 86). Petitioner points to a statement in Barsoum as “specifying that not all geometrically shaped constellations have a greater capacity than that of a constellation maximized for $d_{\min}$.” *Id.* at 17 (citing Ex. 1027, 6:13–22). Petitioner asserts that Barsoum’s non-uniform constellations are capable of providing such greater parallel decoding capacity only after having been optimized for that purpose. *Id.* at 19 (citing Ex. 1027, 6:13–22, Ex. 1003 ¶ 92).

Patent Owner disagrees, arguing that Barsoum describes determining optimized constellations for each operating SNR. Prelim. Resp. 74 (citing Ex. 1027, 4:62–5:11, 7:26–29, 8:47–56). Patent Owner further argues that the teachings related to optimizing a constellation for capacity at a first SNR also teach that other constellations optimized for a different SNR will not provide the same benefits at the first SNR. *Id.* We agree. Patent Owner correctly points to the specific examples of Figures 11b, 13b, 15b, and 17b as each showing a plurality of constellations, each optimized for a particular SNR that provide a greater parallel decoding capacity at that specific SNR than the other symbol constellations in the plurality. *Id.* at 75. More specifically, Figure 13b shows five constellations (i.e. a plurality), each optimized for a particular identified SNR that will perform better at that particular SNR than the other constellations which have not been optimized at that particular SNR. *Id.* at 76–77.

For these reasons, we determine that Petitioner has not shown that claims 6, 16, and 27 lack written description support in Barsoum. Petitioner does not assert that claims 7, 17, and 28 lack written description support in Barsoum for any reason separate than provided by its assertions against parent claims 6, 16, and 27. Therefore, Petitioner has not shown a lack of written description in claims 7, 17, and 28.

For the above described reasons, Petitioner has not shown that the '509 patent may not receive the benefit of the filing date of the '777 patent; i.e., Barsoum. Consequently Petitioner has not shown that Barsoum is prior art to claims 6, 7, 16, 17, 27, and 28 of the '509 patent.

2. *35 U.S.C. § 103*

As noted previously, the Petition argues that dependent claims 6–7, 16–17, and 27–28 are obvious over the combination of Barsoum and ATSC327. Pet. 26. Each of the Petition's grounds relies entirely on Barsoum to teach or suggest each limitation of independent claims 1, 11, and 21 upon which the challenged claims depend. Pet. 39–71, 96–98, 101–102. Apart from the written description support arguments above, Patent Owner does not contest Petitioner's obviousness analysis of the challenged claims. *See Prelim. Resp.*

As we have determined that Barsoum is not prior art to claims 6, 7, 16, 17, 27, and 28, the Petition does not establish a reasonable likelihood that those claims are obvious over the combination of Barsoum and ATSC327.

E. Discretionary Denial Under 35 U.S.C. § 314

Patent Owner contends the Board should exercise its discretion to deny institution under 35 U.S.C. § 314, in view of *Apple Inc. v. Fintiv, Inc.*,

IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020). Paper 9 (Patent Owner's Limited Fintiv Submission). Petitioner disagrees. Pet. 102–103. Because we have determined that the Petition may be denied because it has not shown a reasonable likelihood that any claim would have been unpatentable, we need not reach the issue of discretionary denial.

III. CONCLUSION

For the foregoing reasons, we have determined that there is not a reasonable likelihood that the Petitioner would prevail with respect to at least one claim challenged in the Petition. We, therefore, do not institute trial as to any claim or any ground set forth in the Petition.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that no *inter partes* review of U.S. Patent 11,019,509 B1 is instituted.

IPR2023-00320
Patent 11,019,509 B1

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