

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

LG ELECTRONICS, INC.,
Petitioner,

v.

CONSTELLATION DESIGNS, LLC,
Patent Owner.

IPR2022-01549
Patent 10,567,980 B2

Before MIRIAM L. QUINN, CHRISTOPHER L. OGDEN, and
BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

DECISION

Denying Institution of *Inter Partes* Review
35 U.S.C. § 314, 37 C.F.R. § 42.4

I. INTRODUCTION

A. *Background and Summary*

Petitioner, LG Electronics Inc., requests that we institute an *inter partes* review challenging the patentability of claims 1–8, 11–26, 29–36, 39, and 40 (the “challenged claims”) of U.S. Patent 10,567,980 B2 (Ex. 1001, “the ’980 patent”). Paper 2 (“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.”).

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 decline to 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., Dec. 9, 2021). Pet. 104–105; Paper 4, 1. Patent Owner also identifies the following *inter partes* review: IPR2022-01482. Paper 4, 1.

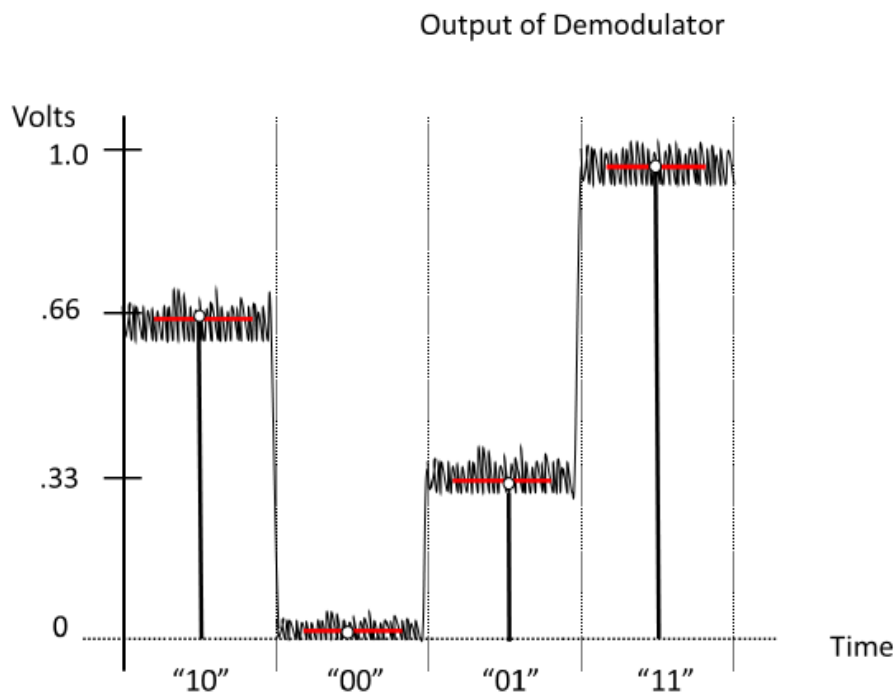
C. *The ’980 Patent*

The ’980 patent is directed to digital communication or transmission systems with “unequally spaced constellations.” Ex. 1001, 1:36–39. As background to the technology, “[a] digital communication system is used to transmit digital bits (sequences of 0s and 1s) from one device (a transmitter) to another (a receiver).” Ex. 2001 ¶ 12. “[A] ‘constellation’ point is a carrier signal value (such as amplitude and/or phase) that can be used to represent a longer sequence of bits.” *Id.* Signal values were commonly determined based on maintaining a minimum distance ($d_{\min}$) between the values based

on the capacity, such as available power, and the signal to noise ratio (SNR).
Ex. 1001, 1:42–52. This is to decrease the risk that the noise in the signal makes the signal unreadable, i.e. decreases the risk that the system is unable to determine which signal value was intended between two adjacent signal values. As a simple illustration, Patent Owner’s declarant, Dr. Giuseppe Caire, provides the following example of a one-dimensional constellation, with bit values (constellation label) and signal amplitude values (constellation location):

Constellation Label	Constellation Location
“00”	0
“01”	.33
“10”	.66
“11”	1.0

Ex. 2001 ¶ 29. An output based on this constellation, including an illustration of signal noise, is reproduced below.



Id. ¶ 32. The above figure, provided by Dr. Caire, is a graph of the signal amplitude, in volts, over time. As can be seen above, “a time-dependent continuous waveform is shown in black including noise, the average of the time-dependent continuous waveform is shown in red, the output of the demodulator is shown as discrete time values in black, and the figure is again annotated with the corresponding bit sequence.” *Id.* Thus, it can be seen how each bit value (constellation label) corresponds to the signal amplitude value (constellation location) in wave form. The receiver, with information about the constellation, is thus able to determine the bit values communicated from the transmitter.

As mentioned, the '980 patent is directed to digital communication systems with “unequally spaced constellations.” Ex. 1001, 1: 36–39. Rather than focusing on maintaining a minimum distance ($d_{\min}$) between the signal values of the constellation, the '980 patent attempts to determine signal values “characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity of the constellation at a given signal-to- noise ratio.” *Id.* at Abst.; *see also id.* at 5:61–6:23. The '980 patent explains that “capacity optimized constellation at low SNRs are geometrically shaped constellations that can achieve significantly higher performance gains (measured as reduction in minimum required SNR) than constellations that maximize $d_{\min}$.” *Id.* at 8:24–29.

“Capacity measures that can be used in the selection of the location of constellation points include . . . parallel decode (PD) capacity and joint capacity.” *Id.* at 5:6–9. The “PD capacity of a channel can be viewed in terms of the mutual information between the output bits of the encoder (such as an LDPC encoder) at the transmitter and the likelihoods computed by the

demapper at the receiver,” and it is “influenced by both the placement of points within the constellation and by the labelling assignment.” *Id.* at 6:65–7:3. Joint capacity describes “the achievable capacity between the input of the mapper on the transmit side of the link and the output of the channel (including for example AWGN and Fading channels).” *Id.* at 7:18–21.

The '980 patent discusses a number of methods for optimizing the constellation, of which Figure 5, reproduced below is one example. *See e.g., id.* at 7:31–12:40.

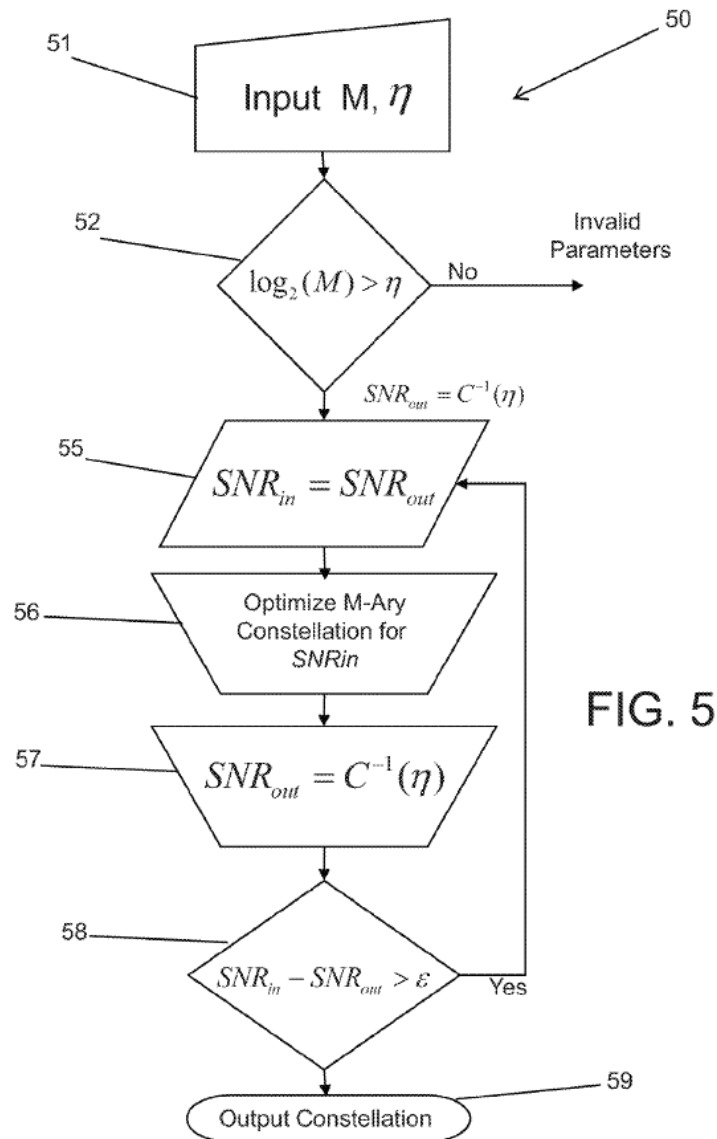


Figure 5 of the '980 patent, shown above, is a flowchart illustrating a method of optimizing a constellation for capacity. The '980 patent describes the process as follows:

The process 50 commences with the selection ([51]) of an appropriate constellation size M and a desired capacity per dimension η . In the illustrated embodiment, the process involves a check (52) to ensure that the constellation size can support the desired capacity. In the event that the constellation size could support the desired capacity, then the process iteratively optimizes the M -ary constellation for the specified capacity. Optimizing a constellation for a specified capacity often involves an iterative process, because the optimal constellation depends upon the SNR at which the communication system operates. The SNR for the optimal constellation to give a required capacity is not known a priori. . . .

In the illustrated embodiment, the iterative optimization loop involves selecting [(55)] an initial estimate of the SNR at which the system is likely to operate (i.e. SNR_{in}). . . . An M -ary constellation is then obtained by optimizing (56) the constellation to maximize a selected capacity measure at the initial SNR_{in} estimate. . . .

The SNR at which the optimized M -ary constellation provides the desired capacity per dimension η (SNR_{out}) is determined (57). A determination (58) is made as to whether the SNR_{out} and SNR_{in} have converged. In the illustrated embodiment convergence is indicated by SNR_{out} equaling SNR_{in} When SNR_{out} and SNR_{in} have not converged, the process performs another iteration selecting SNR_{out} as the new SNR_{in} (55). When SNR_{out} and SNR_{in} have converged, the capacity measure of the constellation has been optimized. . . . [C]apacity optimized constellation at low SNRs are geometrically shaped constellations that can achieve significantly higher performance gains (measured as reduction in minimum required SNR) than constellations that maximize d_{min} .

Id. at 7:39–8:29.

D. Illustrative Claim(s)

Of the challenged claims, claims 1, 20, 39, and 40 are independent, and claim 1 is illustrative:

1. A digital communication system, comprising:

a transmitter capable of transmitting signals via a communication channel, the transmitter comprising:

a coder capable of receiving user bits and outputting encoded bits at a data rate;

a mapper capable of mapping encoded bits to symbols in a symbol constellation; and

a modulator capable of generating a modulated signal for transmission via the communication channel using symbols generated by the mapper;

wherein the symbol constellation is an unequally spaced symbol constellation that is characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity of the symbol constellation at a given signal-to-noise ratio so that the symbol constellation provides a given capacity at a reduced signal-to-noise ratio compared to a uniform symbol constellation that differs from the symbol constellation only in that the minimum distance, $d_{\min}$, between constellation points of the uniform symbol constellation is maximized.

Ex. 1001, 13:43–63.

E. Evidence

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

Name	Non-Patent Literature	Author	Exhibit
De Gaudenzi ¹	<i>Turbo-coded APSK modulations design for satellite broadband communications</i> , Int. J. Satell. Commun. Network, 2006, 24:261–281	De Gaudenzi, Albert Guillen i Fàbregas, Alfanzo Martinez	1012

Name	Non-Patent Literature	Author	Exhibit
Sommer	<i>Signal Shaping by Non-Uniform QAM for AWGN Channels and Applications Using Turbo Coding</i> , Jan. 2000	D. Sommer, G.P. Fettweis	1004
Caire	<i>Bit-Interleaved Coded Modulation</i> , IEEE Transactions of Information Theory, vol. 44, no. 3, May 1998	Giuseppe Caire, Giorgio Taricco, Ezio Biglieri	1013
Simon	<i>Combined Trellis Coding With asymmetric MPSK modulation</i> , An MSAT-X Report, May 1, 1985	M.K. Simon, D. Divsalar	1015

Name	Patent Document	Exhibit
De Gaudenzi	US Patent Pub. 2003/0223507 A1 (Dec. 4, 2003)	1007

F. Asserted Grounds

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

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–8, 13, 14, 16–26, 31, 32, 34–36, 39, 40	102 ²	De Gaudenzi1
1–8, 13, 14, 16–26, 31, 32, 34–36, 39, 40	103(a)	De Gaudenzi1

¹ Though the general asserted grounds are identified (Pet. 1–2), it is not clear how the references are applied for each ground. The grounds are not distinguished in the discussion of the claims (*id.* at 43–100); thereby presenting an extensive “either/or” situation where we are invited to create our own grounds among multiple alternatives. This alone is reason to deny the Petition. See *Adaptics Ltd. v. Perfect Co.*, IPR2018-01596, Paper 20 (March 6, 2019) (informative).

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. We refer to the pre-AIA version of §§ 102, 103.

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–8, 13, 14, 16–26, 31, 32, 34–36, 39, 40	103(a)	De Gaudenzi1, De Gaudenzi
6, 24	103(a)	De Gaudenzi1, Caire
6, 24	103(a)	De Gaudenzi1, De Gaudenzi, Caire
14, 15, 18, 32, 33, 35	103(a)	De Gaudenzi1, Sommer
14, 15, 18, 32, 33, 35	103(a)	De Gaudenzi1, De Gaudenzi, Sommer
1–8, 11–14, 16–26, 29–32, 34–36, 39, 40	103(a)	De Gaudenzi1, Simon
1–8, 11–14, 16–26, 29–32, 34–36, 39, 40	103(a)	De Gaudenzi1, De Gaudenzi, Simon
6, 24	103(a)	De Gaudenzi1, Simon, Caire
6, 24	103(a)	De Gaudenzi1, De Gaudenzi, Simon, Caire
14, 15, 18, 32, 33, 35	103(a)	De Gaudenzi1, Simon, Sommer
14, 15, 18, 32, 33, 35	103(a)	De Gaudenzi1, De Gaudenzi, Simon, Sommer

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). At this preliminary stage, 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 anticipated [under 35 U.S.C. § 102] only if each and every element as set forth in the claim is found, either expressly or inherently

described, in a single prior art reference.” *Verdegaal Bros. Inc. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover, “[b]ecause the hallmark of anticipation is prior invention, the prior art reference—in order to anticipate under 35 U.S.C. § 102—must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). Whether a reference anticipates is assessed from the perspective of an ordinarily skilled artisan. *See Dayco Prods., Inc. v. Total Containment, Inc.*, 329 F.3d 1358, 1368 (Fed. Cir. 2003) (“‘[T]he dispositive question regarding anticipation [i]s whether one skilled in the art would reasonably understand or infer from the [prior art reference’s] teaching’ that every claim element was disclosed in that single reference.”).

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. Superior education could compensate for a deficiency in work experience, and *vice-versa*.

Pet. 10 (citing Ex. 1003 ¶¶ 21–23).

Patent Owner does not address or contest Petitioner's level of skill. *See generally* Prelim. Resp. We are persuaded, on the present record, that Petitioner's proposal is consistent with the problems and solutions in the '980 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. 11. Patent Owner does not address claim construction. *See generally* Prelim. Resp.

We determine that no terms need to be construed for purposes of this Decision. *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. 35 U.S.C. §§ 102 / 103

Each of the identified grounds largely, or completely, relies on De Gaudenzi1. *See generally*, Pet. 1–2, 11–100. For example, each ground relies almost entirely³ on De Gaudenzi1 to teach the last limitation of independent claims 1, 20, 39, and 40. Pet. 58–66, 98–100. Among other arguments, Patent Owner argues that the Petition is lacking with respect to this limitation. *See Prelim. Resp.* 2–5, 31–40, 43–53.

For the reasons expressed below, we determine that Petitioner has not established a reasonable likelihood of succeeding in showing that De Gaudenzi1 teaches the last limitation of independent claims 1, 20, 39, and 40. Thus, Petitioner has not established a reasonable likelihood of showing that any of the claims are unpatentable.

1. De Gaudenzi1

De Gaudenzi1 is an article titled “Turbo-coded APSK modulations design for satellite broadband communications.” Ex. 1012, 1. De Gaudenzi1 is directed to “the design of power and spectrally efficient coded modulations based on amplitude phase shift keying (APSK) modulation” as

³ The Petition argues that Simon in combination with De Gaudenzi1 also teaches the unequal spacing of the constellation, but does not rely on Simon for any other aspect of the claim limitation. Pet. 59–60.

applied to satellite broadband communications. *Id.* at Summary. In particular, De Gaudenzi1 uses a “binary serially concatenated turbo-code coupled with optimal APSK modulations through bit-interleaved coded modulation.” *Id.* De Gaudenzi1 further states that their method “generates an optimum constellation for each spectral efficiency,” while also focusing on “the minimum distance criterion.” *Id.* The method relies on assumptions of “an ideal rectangular transmission pulse, for which no nonlinear inter-symbol interference is present and perfect pre-compensation of the nonlinearity.” *Id.*

2. Analysis of the Claims

Independent claim 1 includes the following limitation:

wherein the symbol constellation is an unequally spaced symbol constellation that is characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity

Ex. 1001, 13:53–56. Each of independent claims 20, 39, and 40 include a similar limitation. *See id.* at 15:7–10, 16:49–53, 17:1–5. Because all of the challenged dependent claims depend from these independent claims, this limitation is relevant to all challenged claims.

Petitioner argues that De Gaudenzi1 discloses symbol constellations with unequally spaced constellation points. Pet. 58 (citing Ex. 1012, 4, Fig. 1). The Petition also argues that Simon in combination with De Gaudenzi1 teaches symbol constellations with unequally spaced constellation points. *Id.* at 59–60 (citing Ex. 1012, Fig. 1; Ex. 1015, Fig. 2; Ex. 1003 ¶ 166). These contentions are not contested by Patent Owner. *See generally* Prelim. Resp.

Petitioner argues that De Gaudenzi1 “discloses that *locations* (e.g., the radii and phase shifts) *and labels* (e.g., using Gray labeling/mapping) of

constellation points are assigned to maximize parallel decode capacity (e.g., BICM mutual information/capacity).” Pet. 61 (citing Ex. 1012, 4, 6, 12–13, FIG.1). Petitioner explains that De Gaudenzi1 optimizes the constellation by varying the radii and phase shifts, i.e., the locations of the constellation points. *Id.* (citing Ex. 1012, 4, 6; Ex. 1003 ¶ 167). Petitioner explains that De Gaudenzi1 has a labeling rule that follows “‘Gray labelling’/‘Gray mapping,’ or ‘the pseudo-Gray labellings.’” *Id.* Petitioner then argues that De Gaudenzi1 teaches “that ‘the optimization method based on the mutual information [maximization] . . . can be easily extended to the case of the BICM mutual information [maximization] [13](sic, [14]) with almost identical results assuming Gray mapping.’” *Id.* at 63 (alterations other than omission in original) (quoting Ex. 1012, 12 n.§). Petitioner argues that this teaches the above claimed limitation because BICM mutual information is a type of parallel decode capacity.

In response, Patent Owner argues that De Gaudenzi1 does not teach that the constellation “is characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity,” as claimed. In support, Patent Owner submits the declaration of Dr. Guillén i Fàbregas, one of the authors of De Gaudenzi1 (and coinventor of De Gaudenzi). Ex. 2002 ¶¶ 8–9. In particular, Dr. Fàbregas states:

My co-authors and I did not develop and did not describe assigning constellation labels to maximize capacity, let alone parallel decode capacity. Instead, our disclosed process and system required that the labels be preselected and remain static.

. . .

My co-authors and I did not develop and did not describe assigning constellation locations to maximize parallel decode capacity.

. . . Indeed, our optimization algorithm did not attempt to maximize parallel decode capacity.

Ex. 2002 ¶¶ 20, 30; *see also id.* ¶¶ 20–34 (explaining the teachings of De Gaudenzi1 in more detail).

Concerning the assignment of constellation point labels, Dr. Fàbregas explains that De Gaudenzi1 “disclose[s] an optimization process, but we did not vary constellation labels as part of that optimization process, either to determine and assign the labels that maximize parallel decode capacity or otherwise.” *Id.* ¶ 21 (citing Ex. 1012, 4–8). Dr. Fàbregas states that De Gaudenzi1 “explicitly required that all labels be predetermined and assigned using a preselected mapping, known as Gray or Pseudo-Gray mapping,” and that “these predetermined labels had to be used regardless of whether different labels would result in an improved parallel decode capacity.” *Id.* (citing Ex. 1012, 4–8, 15).

Patent Owner also provides a declaration from Dr. Giuseppe Caire, one of the authors of Caire (Ex. 2001 ¶ 8), who provides similar supporting testimony as to what De Gaudenzi1 teaches concerning the constellation point labels. For example, Dr. Caire states that De Gaudenzi1 teaches using Gray and Pseudo-Gray labels and that “Gray and Pseudo-Gray labels are each well-known mappings of constellation labels, in which the **labels are predetermined and static**” and thus, capacity is not taught to be maximized by assigning the constellation point labels. *Id.* ¶¶ 85–86; *see also id.* ¶¶ 71–74, 79–86 (explaining the teachings of De Gaudenzi1 concerning constellation point labels in more detail).

Concerning the assignment of constellation point locations, Dr. Fàbregas explains that De Gaudenzi1 does not “vary and assign locations to maximize capacity, let alone parallel decode capacity.” Ex. 2002 ¶ 23 (citing

Ex. 1012, 4–5). Dr. Fàbregas states that constellation point locations are defined by “the signal’s amplitude and its phase,” but that those locations are constrained in ways that “actively prevent maximum parallel decode capacity from being achieved, including constraints on the number of constellation points located at each ring (amplitude) and the differences in phase for each of those locations.” *Id.* (citing Ex. 1012, 4–8); *see also id.* ¶¶ 24–27, 30–34 (explaining the restrictions in more detail).

Dr. Caire provides similar supporting testimony as to what De Gaudenzi1 teaches concerning the constellation point locations. Ex. 2001 ¶¶ 75–83, 88–96. For example, Dr. Caire states that De Gaudenzi1 “does not freely assign these locations in order to achieve maximum parallel decode capacity,” but “[i]nstead, . . . puts constraints on the available locations which actively prevent maximum parallel decode capacity from being achieved, including constraints on the number of constellation points located at each ring (amplitude) and the differences in phase for each of those locations.” *Id.* ¶ 75 (citing Ex. 1012, 4–8).

We find the testimony of Drs. Fàbregas and Caire convincing as to what De Gaudenzi1 teaches. Further, we note that Petitioner’s argument and supporting declaration testimony are conclusory and do not sufficiently explain how De Gaudenzi1 teaches “an unequally spaced symbol constellation that is characterizable by assignment of locations and labels of constellation points to maximize parallel decode capacity.”

For example, though the Petition states that De Gaudenzi1 has a labeling rule that follows “‘Gray labelling’/‘Gray mapping,’ or ‘the pseudo-Gray labellings,’” it does not sufficiently explain why the existence of a labeling rule maximizes parallel decode capacity. *See* Pet. 61. Further,

because Drs. Fàbregas and Caire testify that Gray and Pseudo-Gray labels are predetermined (*see, e.g.*, Ex. 2001 ¶ 86; Ex. 2002 ¶ 21), the record lacks evidence of, and it is Petitioner’s burden to explain, how predetermined constellation point labels are assigned to maximize parallel decode capacity as required by the claim.

Similarly, though the Petition states that De Gaudenzi1 varies the radii and phase shifts, i.e., the locations of the constellation points, it does not sufficiently explain why varying the radii and phase shifts maximizes parallel decode capacity. *See* Pet. 61. In fact, both Drs. Fàbregas and Caire testify convincingly that De Gaudenzi1 constrains the locations “in ways that ‘actively prevent maximum parallel decode capacity from being achieved.’” Ex. 2002 ¶ 23; *see also*, Ex. 2001 ¶ 75.

Further, the cited testimony of Petitioner’s declarant concerning De Gaudenzi1’s labeling and locating of constellation points is identical to the Petition. *Compare* Pet. 61, *with* Ex. 1003 ¶¶ 167–168. Because the declarant testimony, like the Petition, is conclusory in nature with respect to how De Gaudenzi1 teaches assigning labels and locations of constellation points to maximize parallel decode capacity, it is entitled to little weight. *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (August 24, 2022) (precedential) (holding declaration is entitled to little weight when it contains an exact restatement of the petition’s conclusory arguments without any additional supporting evidence or reasoning).

As the Petition does not sufficiently identify how De Gaudenzi1 teaches the “maximize” limitation in the independent claims, it fails to establish a reasonable likelihood of prevailing in showing that any of the claims are unpatentable.

III. CONCLUSION

For the foregoing reasons, we do not institute trial.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314(a), no *inter partes* review as to any claim of U.S. Patent 10,567,980 B2 is instituted.

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