

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

IPR2024-00445
Patent 10,135,682 B2

Before BARBARA A. PARVIS, JON M. JURGOVAN, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

LANEY, *Administrative Patent Judge*.

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

I. INTRODUCTION

Comcast Cable Communications, LLC (“Petitioner”) filed a Petition (Paper 2 (“Pet.”)) requesting *inter partes* review of claims 1–18 (“challenged claims”) of U.S. Patent No. 10,135,682 B2 (Ex. 1101, “the ’682 patent”). Entropic Communications, LLC (“Patent Owner”) filed a Preliminary Response (Paper 8 (“Prelim. Resp.”)).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition and any response “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” For the reasons provided below, we determine that Petitioner has not demonstrated a reasonable likelihood that it will prevail in showing the unpatentability of at least one challenged claim. Accordingly, we do not institute *inter partes* review of the ’682 patent.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies Comcast Corporation, Comcast Cable Communications, LLC, and Comcast Cable Communications Management, LLC as the real parties-in-interest. Pet. 1. Patent Owner names itself as the real party-in-interest. Paper 4, 1.

B. *Related Matters*

Both parties identify the following district court proceeding involving assertion of patents against Petitioner: *Entropic Communications, LLC v. Comcast Corporation et al.*, Case No. 2-23-cv-01050 (C.D. Cal.). Pet. 1; Paper 4, 1. The parties likewise identify the following district court proceedings in which the ’682 patent has been asserted: *Entropic*

Communications, LLC v. Cox Communications, Inc. et al., Case No. 2-23-cv-01049 (C.D. Cal.) and *Entropic Communications, LLC v. Charter Communications, Inc.*, Case No. 2-22-cv-00125 (E.D. Tex.). Pet. 1–2; Paper 4, 1. Additionally, the parties identify IPR2024-00444, in which Petitioner has filed a second petition for *inter partes* review of the '682 patent. And, lastly, the parties identify the following related patents and applications: U.S. Patent Nos. 9,866,438, 9,577,886, 9,419,858 and U.S. Application Nos. 13/948,444, 16/195,053. Pet. 2; Paper 4, 1–2.

C. The '682 Patent

The '682 patent is titled “Method And System For Service Group Management In A Cable Network.” Ex. 1101, code (54). The '682 patent relates to service group management in a cable television network. *Id.* at 1:50-52. “A cable modem termination system (CMTS) may determine, for a plurality of cable modems (CMs) served by the CMTS, a corresponding plurality of SNR-related metrics” and “assign the modems among a plurality of service groups based on the SNR-related metrics.” *Id.* code (57).

An exemplary process for grouping cable modems (CMs) in is shown in Figure 3A reproduced below.

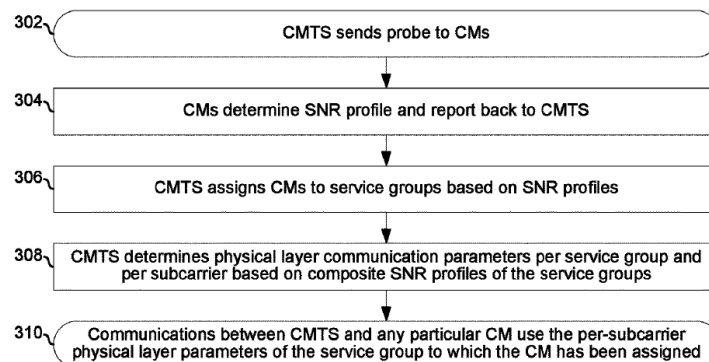


FIG. 3A

Figure 3A is a flowchart illustrating a process that begins with block 302 in which the CMTS 102 sends one or more probe messages to the CMs. Ex. 1101, 5:28–34. In block 304, each of the CMs determines its respective SNR profile based on a received one of the messages, and reports the SNR profile back to the CMTS in the form of a message. *Id.* at 5:34–37. In block 306, the CMTS assigns the CMs to service groups based on the SNR profiles. *Id.* at 5:37–39. In block 308, physical layer communication parameters are determined per service group and per channel/subcarrier. *Id.* at 5:40–41. The '682 explains that

for any particular service group, the modulation order and FEC code rate to be used on a particular subcarrier may be determined based on the worst-case SNR for that subcarrier among the CMs in that particular service group. Thus, it can be seen that grouping CMs based on SNR profiles may enable configuring physical layer communications parameters to such that one or more communication parameters (throughput, reliability, etc.) is optimal, or near optimal, for all of the CMs in the service group . . . [and] without such grouping by SNR profile, one CM in a particular service group may have substantially lower SNR on one or more channels/subcarriers. As a result, all CMs in that particular service group may be forced to use physical layer parameters supported by this “lowest common denominator” CM. This may result in a lot of wasted capacity for the remaining CMs.

Id. at 5:42–57. Finally, at block 310, communications between the CMTS and any particular service group use the per-service-group and per-subcarrier/channel physical layer parameters that were determined in block 308. *Id.* at 6:3–6.

D. Illustrative Claim

Petitioner challenges claims 1–18 of the '682 patent. Pet. 4. Claims 1 and 10 are the independent claims challenged. Claims 2–9 depend from

claim 1 and claims 11–18 depend from claim 10. Independent claim 1, reproduced below, is illustrative of the claimed subject matter.

1. [1A¹] A method comprising:
 - [1B] determining, by a cable modem termination system (CMTS), for each cable modem served by said CMTS, a corresponding signal-to-noise ratio (SNR) related metric;
 - [1C] assigning, by said CMTS, each cable modem among a plurality of service groups based on a respective corresponding SNR-related metric;
 - [1D] generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR related metrics corresponding to said one of said plurality of service groups;
 - [1E] selecting, by said CMTS, one or more physical layer communication parameter to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and
 - [1F] communicating, by said CMTS, with one or more cable modems corresponding to said one of said plurality of service groups using said selected one or more physical layer communication parameter.

Ex. 1101, 8:2–23. Independent claim 10 recites the same limitations, except claim 10 is directed to a system, rather than a method, and recites that a “processor is configured to” perform steps [1B]–[1E] and a “network interface is configured to” perform step [1F]. *Id.* at 9:12–35.

E. Evidence

Petitioner relies on the prior art references in the table below.

¹ Herein, we use Petitioner’s designations for the limitations of claim 1. Pet. 71.

Name	Reference	Exhibit
Cooper	US 2007/0223512 A1, published Sept. 27, 2007	1105
Saey	US 2005/0111535 A1, published May 26, 2005	1107
Gross	US 2004/0085987 A1, published May 6, 2004	1108
Cioffi	US 2006/0274825 A1, published Dec. 7, 2006	1109
Thibeault	US 2013/0041990 A1, published Feb. 14, 2013	1110
Monk802	US 8,085,802 B1, issued Dec. 27, 2011	1114
Monk	US 7,573,822 B1, issued Aug. 11, 2009	1115
Cooper437	US 6,772,437 B1, issued Aug. 3, 2004	1116

Petitioner also relies on the Declaration of Sayfe Kiaei, Ph.D. (Ex. 1102) to support its contentions that the challenged claims are unpatentable.

F. Asserted Grounds

Petitioner asserts that the challenged claims of the '682 patent are unpatentable based on the grounds in the table below (Pet. 14–15):

Claims Challenged	35 U.S.C. §	Reference/Basis
1, 2, 10, 11	103	Thibeault, Saey
1, 2, 10, 11	103	Thibeault, Gross
1, 2, 10, 11	103	Thibeault, Cioffi
7, 8, 16, 17	103	Thibeault, Saey, Cooper
7, 8, 16, 17	103	Thibeault, Gross, Cooper
7, 8, 16, 17	103	Thibeault, Cioffi, Cooper
3–6, 12–15	103	Thibeault, Saey, Monk802
3–6, 12–15	103	Thibeault, Gross, Monk802
3–6, 12–15	103	Thibeault, Cioffi, Monk802
9, 18	103	Thibeault, Saey, Monk, Cooper437

Claims Challenged	35 U.S.C. §	Reference/Basis
9, 18	103	Thibeault, Gross, Monk, Cooper437
9, 18	103	Thibeault, Cioffi, Monk, Cooper437

III. ANALYSIS

Each ground in this Petition, directly or indirectly, depends on Petitioner’s contention that either Saey, Gross, or Cioffi disclose or suggest “generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR related metrics corresponding to said one of said plurality of service groups.” *See* Pet. 24–28, 33–36, 38–41. Patent Owner asserts that Petitioner’s contention is unsubstantiated because neither Saey, Gross, nor Cioffi are concerned with evaluating a worst-case SNR profile of the cable modems within the service groups to generate a composite SNR-related metric for each service group and that this deficiency is dispositive of the Petition because it undermines Petitioner’s ability to show that there is a reasonable likelihood at least one of the challenged claims is unpatentable. *See* Prelim. Resp. 23–26, 36–40, 46–49. For the reasons discussed below, we agree with Patent Owner.

A. Legal Standard

Petitioner has the burden of proof. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (“In an IPR, the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.”).

Section 103 forbids issuance of a patent when “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). 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 ordinary skill in the art; and (4) when available, evidence such as commercial success, long felt but unsolved needs, and failure of others.² *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966); *see KSR*, 550 U.S. at 407 (“While the sequence of these questions might be reordered in any particular case, the [*Graham*] factors continue to define the inquiry that controls.”). The Court in *Graham* explained that these factual inquiries promote “uniformity and definiteness,” for “[w]hat is obvious is not a question upon which there is likely to be uniformity of thought in every given factual context.” *Graham*, 383 U.S. at 18.

The Supreme Court made clear that we apply “an expansive and flexible approach” to the question of obviousness. *KSR*, 550 U.S. at 415. Whether a patent claiming the combination of prior art elements would have been obvious is determined by whether the improvement is more than the predictable use of prior art elements according to their established functions. *Id.* at 417. To support this conclusion, however, it is not enough to show merely that the prior art includes separate references covering each separate limitation in a challenged claim. *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Rather, obviousness additionally requires

² The present record does not include any objective evidence of nonobviousness.

that a person of ordinary skill at the time of the invention “would have selected and combined those prior art elements in the normal course of research and development to yield the claimed invention.” *Id.*; *see also Orexo AB v. Actavis Elizabeth LLC*, 903 F.3d 1265, 1273 (Fed. Cir. 2018) (“The question is not whether the various references separately taught components of the ’330 Patent formulation, but whether the prior art suggested the selection and combination achieved by the ’330 inventors.”).

In determining whether there would have been a motivation to combine prior art references to arrive at the claimed invention, “it is insufficient to simply conclude the combination would have been obvious without identifying any reason *why* a person of skill in the art would have made the combination.” *Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1366 (Fed. Cir. 2017) (emphasis added). As factfinders, we also must, on the one hand, be aware “of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning,” and, on the other hand, “take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR*, 550 U.S. at 418, 421.

Applying these general principles, we consider the evidence and arguments of the parties.

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art (a skilled artisan) would have had

a degree in computer or electrical engineering, computer science, information systems, or a similar discipline, along with at least three-to-four years of experience with the design and/or implementation of network-based content delivery systems, such as video-on-demand cable systems and Internet video streaming. Additional education may substitute for professional experience,

and significant work experience may substitute for formal education.

Pet. 17 (citing Ex. 1102 ¶¶ 38–43). Patent Owner does not contest Petitioner’s proposed definition of the level of ordinary skill in the art. *See generally* Prelim. Resp.

For purposes of this Decision, we adopt Petitioner’s proposal as reasonable and consistent with the ’682 patent specification and the prior art.

C. Claim Construction

We interpret the challenged 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). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history.

Phillips v. AWH Corp., 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”

Realtime Data, LLC v. Iancu, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner states that “[a]ll claim terms herein should be given their ordinary and customary meaning.” Pet. 17. Patent Owner does not suggest otherwise. *See generally* Prelim. Resp. For the purposes of this Decision,

we determine that no claim term requires express construction. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999).

D. Petitioner Has Not Established Sufficiently That the Prior Art Discloses or Suggests Each and Every Limitation Recited by Independent Claims 1 and 10

Limitations [1D] and [10D] of challenged independent claims 1 and 10 recite “generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR related metrics corresponding to said one of said plurality of service groups.” Ex. 1101, 8:10–15 (Limitation [1D]), 9:22–26 (Limitation [10D]). And each ground in this Petition, directly or indirectly, depends on the sufficiency of Petitioner’s contention that either Saey, Gross, or Cioffi disclose or suggest that limitation. *See* Pet. 24–28, 33–36, 38–41. After studying the submissions of both parties and the evidence of record, however, we determine there is insufficient support for that contention to satisfy Petitioner’s burden for instituting *inter partes* review. And because this deficiency is dispositive of the Petition, we focus our discussion below accordingly, after we first provide an overview of Saey, Gross, and Cioffi.

1. Saey (Ex. 1107)

Saey, titled “Carrier Grouping In Multi-Carrier Systems,” is directed to “a system and method for grouping carriers in multi-carrier systems.” Ex. 1107 code (54), ¶ 1. As background, Saey notes that the advent of increased bandwidth capacity on existing twisted pair connections has led to the adoption of discrete multi-tone (DMT) modulation, which “is a multiple carrier technique that divides the available bandwidth of a communications channel into a number of sub-channels, also referred to as carriers or bins.”

Id. ¶ 3. “Once a connection between two modems has been established,” Saey states, “the modems continue to monitor the changing signal-to-noise ratios on the line and swap bits from one carrier to another to maintain system performance.” *Id.*

Saey notes, however, traditional DMT modulation modems had disadvantages associated with ever increasing number of carriers and the different parameters related to each individual carrier required to be stored and used. Ex. 1107 ¶ 4. “Examples of the various parameters needed for modem operation include the gain, the number of bits that can be loaded onto each carrier (i.e. bit loading), and the signal-to-noise ratio (‘SNR’) of each carrier.” *Id.* Saey identifies one disadvantage with the DMT modulation systems was the consumption of large amounts of memory space required to store all these parameters for each individual carrier, which consequently increases as the number of carriers increases. *Id.* And another disadvantage identified “is the amount of processing time required during the initialization phase of the modems,” which “is long due to the significant amounts of memory required for storing all the parameters for each individual carrier and to the size and number of message transmissions between modems.” *Id.* ¶ 5. Saey’s stated objective is “to solve the aforementioned problems by providing a system and method for grouping carriers in multi-carrier systems.” *Id.* ¶ 7.

Figure 3, reproduced below, is a flow chart illustrating an exemplary method Saey discloses for grouping carriers in a multi-carrier system.

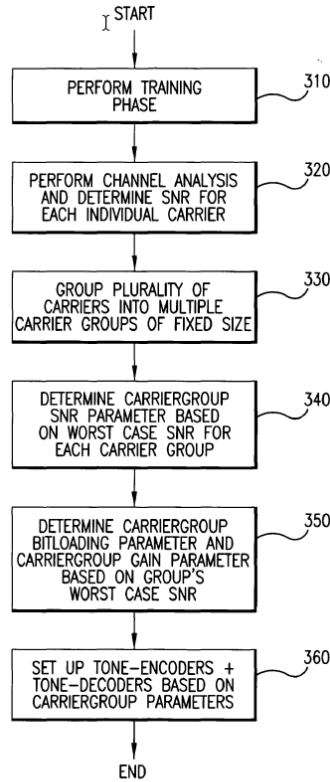


FIG.3

Figure 3 illustrates a method in which multiple carrier groups of fixed-size are determined for the plurality of carriers in the transmission channel and carriergroup parameters are then determined and used to define each carrier group. Ex. 1107 ¶ 28. A training phase is performed at step 310, which includes negotiations between the DMT modem and a far end modem about parameters to be used, determining the channel transfer function, sample and symbol alignment, and channel equalization. *Id.* ¶ 29. The following step 320 analyzes a channel to determine an SNR for each individual carrier in the channel and, then, at step 330 the plurality of carriers in the channel are grouped into multiple carrier groups of fixed sizes. *Id.* ¶¶ 30–31. “At step 340, the worst case SNR for each fixed size carrier group is determined and used to define a ‘carriergroup SNR parameter’ for that specific carrier group.” *Id.* ¶ 32.

After the worst case SNR for each carrier group is determined, step 350 will determine the bit loading and gain each carrier group based on that group's worst case SNR and, as a result, "a 'carriergroup bitloading parameter' and a 'carriergroup gain parameter' can be determined for each carrier group based on that group's carriergroup SNR parameter" and "used to define the carrier group." Ex. 1107 ¶ 33. Finally, at step 360, the carriergroup parameters are used to set up the tone-decoder in the near end modem and the tone-encoder in the far end modem by transmitting the carriergroup parameters to the far end modem to enable the far end modem to appropriately configure its tone-encoder for transmitting messages using the carrier groups and the carriergroup parameters. *Id.* ¶ 34.

2. *Gross (Ex. 1108)*

Gross, titled "Splitterless Multicarrier Modem," is directed to improved digital subscriber line communication system by providing a system that is compatible with existing voice communication services without requiring the use of "plain old telephone service" (POTS) splitters and "efficiently handle[] data communications despite random interruptions associated with concurrent carriage of voice communications or disturbances that arise from concurrent data services on adjacent phone lines." Ex. 1108 code (54), ¶¶ 20–22. The solution, Gross teaches, uses a modem in Digital Subscriber Line (DSL) communications to transmit and receive data over the local subscriber loop in common with voice information over the loop, while avoiding the need for voice/data splitters. "The modem responds to disruptions associated with 'disturbance events,' such as on-hook to off-hook transitions and the like, by rapidly switching between pre-stored

channel parameter control sets defining communications over the loop under varying conditions.” *Id.* code (57).

3. *Cioffi (Ex. 1109)*

Cioffi, titled “Tonal Precoding,” is directed to a precoder that seeks to mitigate or remove interference signals (in particular, “crosstalk”) in twisted pair DSL communication systems, which is interference that can be caused by, for example, other twisted pairs that are in close proximity in a common binder (group) of twisted pairs. Ex. 1109 ¶¶ 10, 12, 66. Cioffi discloses a precoding implementation that uses matrix channel H to model the channel from the users’ transmitters to their receivers. *Id.* ¶ 13. The channel H may be decomposed into matrices R and Q, which can be updated when changes occur to the transmission environment. *Id.* Cioffi teaches that the SNR of a user is proportional to the precoder coefficient within the H matrix channel and can vary with each tone used by each user, as well as, be dependent upon the encoding order of users selected for each tone. *Id.* ¶ 14. In certain embodiments Cioffi discloses, matrix R may be chosen to represent the worst-case noise for the channel and the equivalent H matrix would often be referred to as the worst-case-noise equivalent channel matrix. *Id.* ¶¶ 63–64. Cioffi notes that its teachings “should not be confused as being equivalent” to “non-DSL applications,” because Cioffi’s teachings “incorporate special characteristics that conform to the vectored DMT DSL system setting.” *Id.* ¶ 65.

4. *Petitioner Does Not Demonstrate Sufficiently That Saey Discloses or Suggests Limitations [1D] and [10D]*

Petitioner contends that Saey teaches “selecting the worst-case or lowest SNR of the [cable modems (CMs)] in a group to generate the claimed ‘composite SNR-related metric based at least in part on a worst-case SNR

profile of said SNR related metrics.” Pet. 24–25 (citing Ex. 1102 ¶¶ 101); *see also id.* at 26 (a skilled artisan “would have found it obvious to apply *Saey’s teaching of determining the worst-case SNR for each CM group* to Thibeault’s selection of an optimal physical layer communication parameter (e.g., modulation order”)(emphasis added), 27 (“A [skilled artisan] would have also found it obvious to apply *Saey’s teaching of determining the worst-case SNR for each CM group* in order to implement Thibeault’s dynamic SNR thresholds”) (emphasis added), 27 (“*Saey’s method of determining a worst-case SNR for a group of CMs* also grouped based on their individual SNRs to determine which physical layer parameters to apply to the group”) (emphasis added). As support, Petitioner points to Saey’s teaching of “a method of grouping the various carriers that communicate with various CMs based on a network parameter (e.g., SNR) in a communication system between CMs.” *Id.* at 24 (citing Ex. 1107 code (57), ¶¶ 9–14). Petitioner highlights that “Saey discloses analyzing the SNR for individual carriers and determining a carrier group based on this analysis” and that “[o]nce the carriers have been sorted into groups, the worst-case SNR (e.g., the lowest SNR) in the group is used as the carrier group SNR parameter.” *Id.* (citing Ex. 1107 ¶¶ 10, 13, 14, 25–27, 29–32, 42–43, Figs. 3, 5–6).

The “primary offense” with Petitioner’s contention, Patent Owner argues, is that it is just a “plainly false statement that Saey teaches ‘selecting the worst-case or lowest SNR of the CMs [cable modems] in a group.’” Prelim. Resp. 23–24. Although “[i]t is true that Saey discloses the use of a ‘worst case signal-to-noise ratio (SNR)’ for a carrier group,” Patent Owner emphasizes that “*carriers are not cable modems*” and that “Saey only

discloses single (non-cable) modem-to-single (non-cable) modem communication via carriers.” *Id.* at 24 (citing Ex. 1107 ¶ 10). Patent Owner notes that “[c]arriers are divided portions of the available bandwidth in a channel for communication” and “[w]hen Saey talks about ‘carrier groups,’ it means groupings of smaller segments of bandwidth.” *Id.* (citing Ex. 1107 ¶¶ 3, 27, 31). Patent Owner argues that relying on Saey to teach generating the worst-case or lowest SNR of cable modems in a group, as Petitioner does, is “wrong and unsupported by Saey’s disclosure.” *Id.*

After studying Saey, in view of Petitioner’s contentions and the testimony of declarant Dr. Kiaei, we find Patent Owner’s criticism to have merit. Limitations [1D] and [10D] recite the generation of “a composite SNR-related metric” that is based on “a worst-case SNR profile” of the SNR related metrics determined for the cable modems within a particular “service group.” Ex. 1101, 8:10–15, 9:22–26. However, the evidence from Saey, which Petitioner and Dr. Kiaei reference, neither discloses or suggests creating “a composite SNR-related metric” for a group of cable modems; nor do we find the supporting evidence sufficient to demonstrate that Saey teaches selecting the worst-case or lowest SNR *of the cable modems in a group*. To the contrary, rather than evaluating data about the operation of any other cable modem in a group and generating a composite SNR-related metric for that group of modems, Saey focuses on its individual modem’s ability to efficiently characterize its own communications channel used to transmit/receive information.

Saey teaches that, by “advantageously group[ing] a plurality of carriers in a multicarrier transmission channel into one or more carrier groups and defin[ing] at least one carriergroup parameter relating to each

carr[ier] group,” the disclosed system and method is able to “provide[] significant cost and time savings during the initialization phase since it is no longer necessary to transmit messages comprising the individual parameters for each individual carrier,” “reduce[] the amount of memory required for storing carrier parameters,” and “reduce[] the processing time required during the initialization phase of the modems.” Ex. 1107 ¶ 14. More specifically, with its disclosed system, Saey teaches that, because “messages transmitted using the group of carriers need only describe the carrier group using the carriergroup parameter,” and are no longer required “to transmit the individual parameters . . . for each carrier,” the system “provides significant cost and time savings” by “reduc[ing] the amount of memory required for storing carrier parameters and reduc[ing] the time processing time required to receive and transmit messages.” *Id.* ¶ 41. Notably, each of the benefits Saey describes are attributable to the disclosed modem’s ability to efficiently characterize its own communications channel independent of any consideration of the SNR parameters that another modem may experience over the same communications channel.

In fact, Saey neither discloses nor suggests evaluating and/or processing the SNR determined by another cable modem; let alone evaluating the worst-case or lowest SNR that another cable modem may experience over a carrier in the communications channel. Although Saey teaches that the SNR for each individual carrier is analyzed to determine a carrier group and that the worst-case SNR (e.g., the lowest SNR) in that group is used as the carrier group SNR parameter, Saey only describes using the SNR information determined by the disclosed modem itself from the signals it received on the multi-carrier transmission channel:

during the initialization phase for communication between modems, the carriergrouping receiving means 204 receives or determines at least one individual parameter data for each individual carrier of the plurality of carriers from the multicarrier transmission line or channel 102. For example, the carriergrouping receiving means 204 may receive a random signal transmitted on the channel and determine the signal-to-noise ratio data . . . for each individual carrier in the plurality of carriers from the random signal transmitted on the multi-carrier transmission channel 102. The individual parameter data for each individual carrier is then transmitted to the carriergrouping means 208. The carriergrouping means 208 analyzes the individual parameter data for each individual carrier and then determines at least one grouping for the plurality of carriers in the multi-carrier channel based on the individual parameter data received.

Ex. 1107 ¶ 25; *see also id.* ¶ 30 (describing the disclosed carrier grouping modem as performing a channel analysis step to determine an SNR for each individual carrier in the channel). Thus, rather than being concerned with generating a “composite SNR-related metric” for a group of modems or evaluating the SNR-related metrics exhibited by other modems in a group, Saey only discloses and suggests using the SNR-related metrics of a single modem to establish a carrier group parameter, such as the worst-case or lowest SNR.

As a result, we are not persuaded Petitioner has demonstrated sufficiently that Saey teaches selecting the worst-case or lowest SNR *of the cable modems in a group* to generate a “composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR related metrics.” Therefore, we are likewise not persuaded Petitioner has demonstrated sufficiently that Saey discloses or suggests Limitations [1D] and [10D] of the challenged independent claims.

5. *Petitioner Does Not Demonstrate Sufficiently That Gross Discloses or Suggests Limitations [1D] and [10D]*

Petitioner contends that Gross “teaches a simplified approach that uses single, composite parameters to represent the ‘worst case’ condition for communicating with a group of modems,” such as “measur[ing] the SNR of carriers communicating with different modems and choose the ‘worst case’ SNR to determine a ‘worst case’ or minimum bit allocation to communicate with relevant modems.” Pet. 34 (citing Ex. 1102 ¶¶ 120; Ex. 1108 ¶¶ 44, 100). Petitioner contends further that Gross teaches “determining the worst-case SNR for each CM group,” as well as a method of determining and applying a worst-case SNR based parameter for a group of modems also grouped based on their individual SNRs. *Id.* at 34–36 (citing Ex. 1102 ¶ 121–123; Ex. 1108 ¶¶ 44, 100).

Patent Owner counter that, “like Saey, [Gross] does not disclose groups of modems (of any type, DSL, cable or otherwise)” and that “[w]hatever process Petitioner alleges Gross discloses (worst-case SNR profile or otherwise) that process is not directed at any group of cable modems” because Gross is instead “focused on an individual modem’s control of itself by determining interference sources and ways to tolerate that interference.” Prelim. Resp. 36–37. Patent Owner states that

Gross’s modem evaluates different sources of interference (the telephones, fax machines, etc. connected to the common line) that may affect it. Gross attempts to determine how bad things might be for its DSL modem in isolation, depending on what other devices are in use on its line. And to be clear—Gross’s DSL modem is not communicating with the telephone, fax machine, etc. They are interference sources, not communication partners.

Id. at 37. As a result, Patent Owner concludes that, “like Saey, Gross does not measure a worst-case SNR across modems in a group, or concern itself with communications between *cable* modems and a central controller/service provider” and that “Gross does not teach selection of a composite SNR-related metric of cable modems.” *Id.*

After studying Gross, in view of Petitioner’s contentions and the testimony of declarant Dr. Kiaei, we find ourselves in accord with Patent Owner. In particular, we agree with Patent Owner that Petitioner has failed to demonstrate sufficiently that Gross discloses or suggests generating a single, composite of parameters to represent the “worst case” condition *for communicating with a group of modems* or measuring the SNR of carriers *communicating with different modems* to choose the “worst case” SNR to communicate with any of the modems. We likewise agree Gross is focused on an individual modem’s control of itself by determining interference sources and ways to tolerate that interference.

Although paragraphs 44 and 100 of Gross do teach the use of a “composite [parameter set] formed by selecting, for each subchannel, the minimum bit allocation exhibited by any device for that subchannel, or the most severe characteristic of any other disturbances,” to form “a single ‘worst case’ set that may be used when any device is activated,” we are not persuaded that those paragraphs, when viewed in the context of Gross as whole, supports Petitioner’s contention. When viewed in context, rather than suggesting the generation of a composite SNR-related metric based on a worst-case SNR profile of a group of modems, as Limitations [1D] and [10D] recite, Gross is simply describing an alternative to “using a multiplicity of secondary sub-channel control parameter sets” for controlling

a modem's communications during various disturbance events caused by a particular device or class of devices (e.g., a telephone handset, a facsimile machine, etc.) use of a common communications channel that is used by the modem. *See* Ex. 1108 ¶¶ 37–46. As such, rather than disclosing or suggesting the use of SNR-related metrics associated with group of modems to generate a composite SNR-related metric, Gross remains focused on the SNR-related metrics of an individual modem's communications. The disclosed “composite” is simply a consolidation of the different SNR-related metrics an individual modem experiences *when sharing* the communications channel with various other devices. Thus, like Saey, rather than being concerned with generating a “composite SNR-related metric” for a group of modems or evaluating the SNR-related metrics exhibited by other modems in a group, Saey only discloses and suggests using the SNR-related metrics of a single modem to establish the various parameter sets used to address disturbance events.

Therefore, we are also not persuaded Petitioner has demonstrated sufficiently that Gross teaches selecting the worst-case or lowest SNR *of the cable modems in a group* to generate a “composite SNR-related metric based at least in part on a worst-case SNR profile of said SNR related metrics.” And we are likewise not persuaded Petitioner has demonstrated sufficiently that Gross discloses or suggests Limitations [1D] and [10D] of the challenged independent claims.

6. *Petitioner Does Not Demonstrate Sufficiently That Cioffi Discloses or Suggests Limitations [1D] and [10D]*

Petitioner contends

Cioffi teaches a method of managing a communication system between multiple modems by measuring network

characteristics and adjusting communication protocols to ensure efficient communications despite signal interference or noise within the network. For example, Cioffi teaches using measurements such as SNR to determine the modulation constellation for a channel. As another example, Cioffi further teaches adaptively selecting different communication parameters to account for varying worst-case noise for each channel, leading to higher performance in the communicating in each channel.

Pet. 38–39 (citing Ex. 1109 code (57), ¶¶ 11, 12, 14, 19, 63, 73, 75, 76, 82, 89, 92, 95–101, 112, 124, Tables 1, 2; Ex. 1102 ¶ 131. With the foregoing, Petitioner asserts that a skilled artisan would have recognized the usefulness of generating a composite SNR-related metric based at least in part on a worst-case SNR profile of the SNR related metrics of the group of modems that Thibeault discloses. *See* Pet. 39–41.

Patent Owner argues that Petitioner’s contention merely “gloss[es] over the details of Cioffi and fails to clearly articulate what of Cioffi allegedly meets the requirements of [Limitations [1D] and [10D].” Prelim. Resp. 47. In particular, Patent Owner points out that the Petition “never identifies what of Cioffi meets the ‘composite SNR-related metric’” and it suggests that Petitioner’s analysis has effectively “written that element out of the challenged claims.” *Id.* And Patent Owner is critical of Petitioner’s contention that Cioffi “teaches adaptively selecting different communication parameters to account for varying worst-case noise for each channel” or that it teaches “generating a worst-case SNR-profile for a carrier group.” *Id.* at 47–48 (citing Pet. 39–41; Ex. 1102 ¶¶ 131–133). Patent Owner notes that “Cioffi is concerned with precoding, a technique where the transmitter attempts to predict channel characteristics and modify the transmitted data (pre-code the data), to reduce the effect of crosstalk on the transmitted data.”

Id. at 48 (citing Ex. 1109 ¶ 12). Patent Owner argues that Petitioner fails to explain or provide any evidence, however, that a worst-case SNR *profile* is ever applied to Cioffi's disclosed precoding and that, in fact, Cioffi's teaching associated with the use of a "constellation," which is surmised to be what Petitioner is suggesting to be a "profile," is only applied before Cioffi's disclosed precoding. *Id.* at 49 (citing Ex. 1109 ¶¶ 74, 124).

After studying Cioffi, in view of Petitioner's contentions and the testimony of declarant Dr. Kiaei, we find Patent Owner's criticism to have merit. The evidence from Cioffi, which Petitioner and Dr. Kiaei reference, neither discloses or suggests creating "a composite SNR-related metric" for a group of cable modems or channels. Moreover, Petitioner has failed to carry its burden of showing *with particularity* why a skilled artisan view Cioffi as disclosing or suggest generating a composite SNR-related metric based at least in part on a worst-case SNR profile of the SNR related metrics. More specifically, we agree with Patent Owner that Petitioner's analysis appears to gloss over the details of Cioffi and fails to clearly articulate what of Cioffi allegedly meets the requirements of Limitations [1D] and [10D], which ultimately diminishes the persuasiveness Petitioner's contention. Therefore, we are not persuaded Petitioner has demonstrated sufficiently that Cioffi fills the gap in Thibeault and discloses or suggests Limitations [1D] and [10D] of the challenged independent claims.

IV. CONCLUSION

For the above reasons, we are not persuaded that Petitioner has shown with sufficient particularity why either Saey, Gross, or Cioffi disclose or suggest "generating, by said CMTS for each one of said plurality of service groups, a composite SNR-related metric based at least in part on a worst-

case SNR profile of said SNR related metrics corresponding to said one of said plurality of service groups.” This failing undermines Petitioner’s obviousness contentions for both challenged independent claims under all of the alleged grounds. The same deficiency extends through to all of the grounds challenging the patentability of the dependent claims.

And as a result, based on the arguments and evidence presented by the parties, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the ’682 patent challenged in the Petition. Therefore, we do not institute an *inter partes* review.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied*, and no *inter partes* review is instituted.

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Patent 10,135,682 B2

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