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Paper 11
Entered: August 19, 2024

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

IPR2024-00452
Patent 7,889,759 B2

Before LYNNE H. BROWNE, BARBARA A. PARVIS, 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 1–23 ("challenged claims") of U.S. Patent No. 7,889,759 B2 (Ex. 1001, "the '759 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 '759 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. v. Patent Owner names itself as the real party-in-interest. Paper 7, 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-01048 (C.D. Cal.). Pet. v; Paper 7, 1. The parties likewise identify the following district court proceedings in which the '759 patent has been asserted: *Entropic*

Communications, LLC v. DirecTV, LLC f/k/a DirecTV, Inc. et al., Case No. 2-23-cv-05253 (C.D. Cal.); *Entropic Communications, LLC v. DISH Network Corporation et al.*, Case No. 2-23-cv-01043 (C.D. Cal.); *Entropic Communications, LLC v. Cox Communications, Inc. et al.*, Case No. 2-23-cv-01047 (C.D. Cal.); *Entropic Communications, LLC v. Charter Communications, Inc.*, Case No. 2-23-cv-00050 (E.D. Tex.); and *Entropic Communications, LLC v. ViXS Systems, Inc. et al.*, Case No. 3-13-cv-01102 (S.D. Cal.). Pet. v–vi; Paper 7, 1–2. Lastly, the parties identify IPR2024-00462, in which Dish Network L.L.C. has filed a petition for *inter partes* review of certain claims in the '759 patent.

C. The '759 Patent

The '759 patent is titled "Broadband Cable Network Utilizing Common Bit-Loading." Ex. 1001, code (54). The '759 patent describes a broadband cable network ("BCN") with nodes that communicate through network channels with each other using a multi-carrier modulation technique, such as "bit-loaded orthogonal frequency division multiplexing (OFDM)." Ex. 1001, 7:19–20. "Bit loading is the process of optimizing the bit distribution to each of the channels to increase throughput." *Id.* at 7:12–14.

The process includes determining a common bit-loading modulation scheme for broadcasting/multi-casting from a transmitting node (e.g., A) to multiple receiving nodes (e.g., B, C). Ex. 1001, code (57), 6:55–7:4. The '759 patent depicts this in Figure 5, reproduced below, with NODE A sending the same message to NODEs B and C over Channel A-BC (paths 508). *Id.*

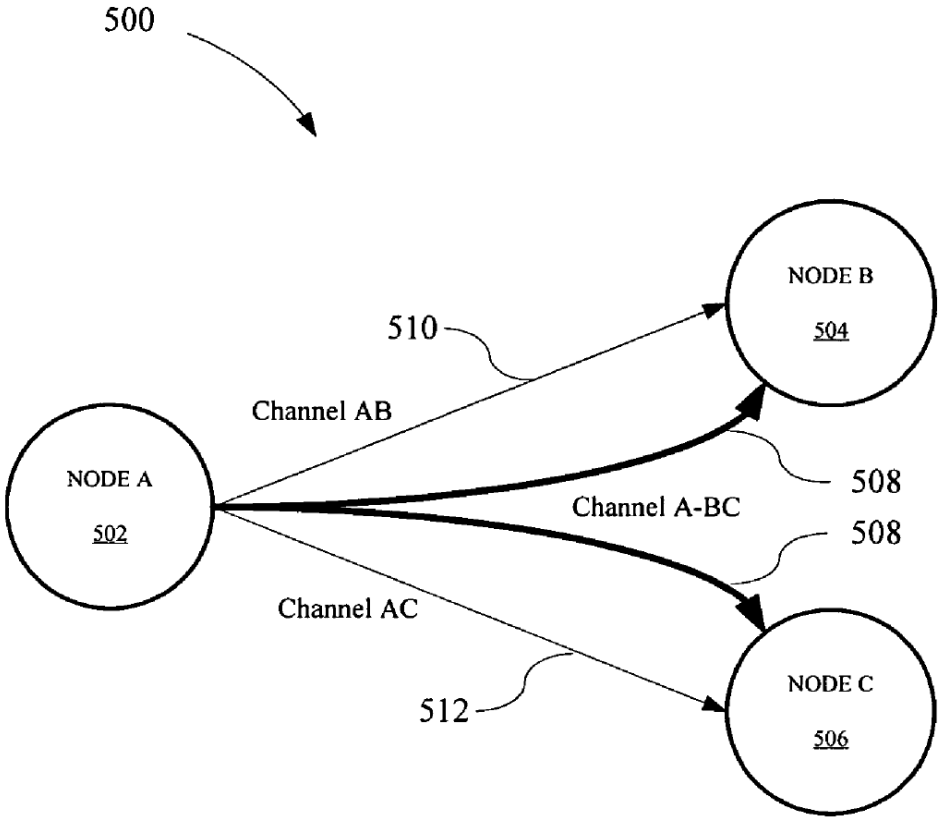

Figure 5 is a "functional diagram showing the communication between the different nodes shown in the BCN." *Id.* at 5:1–3. The different physical and electrical attributes of paths 510, 512 dictate the most-efficient bit-loading modulation scheme for each path. *Id.* at 7:5–12. The '759 patent determines and uses a common bit-loading modulation scheme to facilitate node-to-node communications between various types of customer premises equipment (CPEs) within a BCN within a building (e.g., a home). *Id.* at 3:63–4:3.

As part of the process, the transmitting node (A) sends a probe signal to the receiving nodes (B, C), the receiving nodes reply with a bit-loading modulation scheme, and the transmitting node determines a common scheme from the responses. Ex. 1001, 10:58–11:28.

Figures 10A–10C, reproduced below, illustrate the methodology used for determining the common bit-loading scheme from plural schemes for different transmission paths. Ex. 1001, 10:15–57.

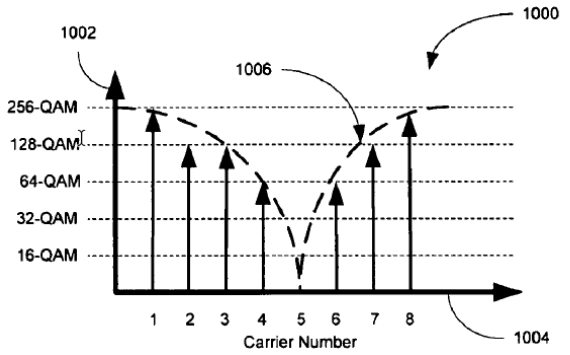

FIG. 10A

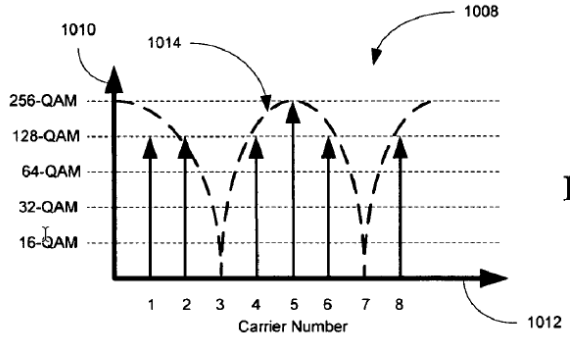

FIG. 10B

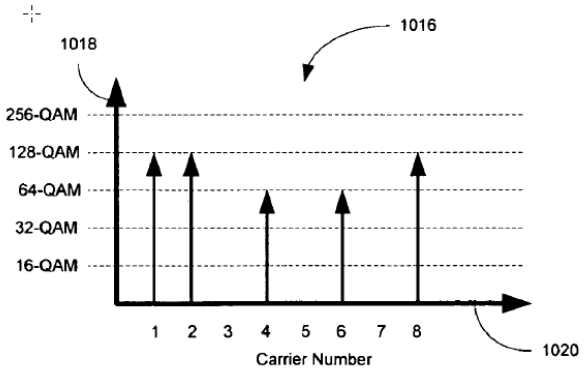

FIG. 10C

Figure 10A depicts a plot of the bit-loading constellation size (QAM order) versus carrier number for the AB channel (path 510) shown in above Figure 5. *Id.* Figure 10B depicts the same for the AC channel (path 512). *Id.* And Figure 10C shows plots that graphically represent the "common bit-loaded modulation scheme" determined for the A-BC channel path between

node A and nodes B and C. *Id.* This "common bit-loaded modulation scheme" is the result of "comparing the carrier number signals from the AB channel in FIG. 10A and the corresponding carrier number signals from the AC channel in FIG. 10B and choosing the lowest corresponding modulation value for each carrier number." *Id.* Thus, the "common bit-loaded modulation scheme" of Figure 10C uses 128-QAM for carriers 1, 2, and 8; 64-QAM for carriers 4 and 6; and carriers 3, 5, and 7 are kept OFF. *Id.*

D. Illustrative Claim

Petitioner challenges claims 1–23 of the '759 patent. Pet. 1. Claims 1–7, 14, and 20–22 are the independent challenged claims. Claims 8–13 depend from claim 1, claims 15–19 depend from claim 14, and claim 23 depends from claim 22. Independent claim 1, reproduced below, is illustrative of the claimed subject matter.

> 1. [1PRE[1]] A method for determining a common bit-loading modulation scheme for communicating between a plurality of nodes in a broadband cable network ("BCN"), the method comprising:
>
> [1A] transmitting a probe signal from a transmitting node within the plurality of nodes to a sub-plurality of receiving nodes within the plurality of nodes;
>
> [1B] receiving a plurality of response signals from the sub-plurality of receiving nodes wherein each response signal includes a bit-loading modulation scheme determined by a corresponding receiving node;
>
> [1C] determining the common bit-loading modulation scheme from the received plurality of response signals;

[1] Herein, we use Petitioner's designations for the limitations of claim 1. Pet. 78.

[1D] receiving the probe signal at one receiving node of the plurality of receiving nodes through a channel path of transmission;

[1E] determining the transmission characteristics of the channel path at the one receiving node; and

[1F] transmitting a response signal from the one receiving node to the transmitting node,

[1G] wherein the transmission characteristics of the channel path are determined by measuring the signal-to-noise ("SNR") characteristics of the received probe signal at the one receiving node and

[1H] wherein determining a common bit-loading modulation scheme includes: comparing a plurality of bit-loading modulation schemes from the corresponding received plurality of response signals; and determining the common bit-loading modulation scheme in response to comparing the plurality of bit-loaded modulation schemes.

Ex. 1001, 12:28–60.

E. Evidence

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

Name	Reference	Exhibit
Gurantz	US 2002/0166124 A1, published Nov. 7, 2002	1007
Grube	US 5,682,419, issued Oct. 28, 1997	1009
Gesbert	US 2002/0056066 A1, published May 9, 2002	1010
Shattil	US 7,418,043 B2, issued Aug. 26, 2008	1011

Petitioner also relies on the Declaration of James Bertonis (Ex. 1002) to support its contentions that the challenged claims are unpatentable.

Patent Owner relies on the Declaration of Samuel H. Russ, Ph.D. (Ex. 2003) to support its contentions that the Petition is deficient.

F. Asserted Grounds

Petitioner asserts that the challenged claims of the '759 patent are unpatentable based on the grounds in the table below (Pet. 11–12):

Claims Challenged	35 U.S.C. §[2]	Reference/Basis
1, 4, 7–9, 11, 14–16, 20, 21	103(a)	Gurantz, Grube
2, 3, 5, 6, 12, 13, 22, 23	103(a)	Gurantz, Grube, Gesbert
10, 17	103(a)	Gurantz, Grube, Shattil
18, 19	103(a)	Gurantz, Grube, Shattil, Gesbert

III. ANALYSIS

Each ground in this Petition, either directly or indirectly, depends on Petitioner's contention that the Gurantz/Grube combination discloses or suggests the selection and combination achieved by the '759 patent. *See* Pet. 25–38, 40–43, 45–48, 52, 53, 55–56, 57–58, 61, 64, 65, 69. When addressing independent claims 1–7, 14, and 20–22, Petitioner relies on the same evidence and reasoning to support its contention that combining Gurantz and Grube in the manner proposed is nothing more than an improvement that is a predictable use of prior art elements according to their established functions. *See id.* Patent Owner asserts, however, that the motivation reasoning underpinning Petitioner's obviousness contention for combining Gurantz and Grube in the manner proposed is deficient and, therefore, 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. 38–66. For the reasons discussed below, we agree with Patent Owner.

[2] The Leahy-Smith America Invents Act ("AIA"), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the challenged claims of the '759 patent have an apparent effective filing date before March 16, 2013, the pre-AIA version of § 103 applies. *See* Ex. 1001, code (22).

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(a) 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.[3] *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.

[3] The present record does not include any objective evidence of nonobviousness.

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 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 bachelor's degree in electrical engineering, computer engineering, or a similar discipline, and three to four years of experience working in signal processing and/or communication systems/networks. Additional education may substitute for experience, and significant work experience may substitute for formal education.

Pet. 17–18 (citing Ex. 1002 ¶ 84). 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 '759 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

> [f]or purposes of this proceeding, the means-plus-function terms in the claims should be construed to cover BCN hardware and/or software systems operable to carry out the particular function recited, at any particular location within the BCN that may be specified in the claims, e.g., at a "transmitting node" or "receiving node" of the network.

Pet. 20. Otherwise, Petitioner states "the claim terms of the '759 patent should be given their ordinary and customary meaning to a POSITA, consistent with the specification and prosecution history." *Id.* at 21. Patent Owner does not propose any express construction at this time. *See generally* Prelim. Resp. Patent Owner, however, does argue for means-plus-function terms that Petitioner fails to "satisfy 37 C.F.R. § 42.104(b)(3) which . . . required Petitioner to 'identify the ***specific portions of the specification*** that describe the structure, material, or acts corresponding to ***each*** claimed function.'" *Id.* at 68.

We do not reach the issue of whether Petitioner complied with 37 C.F.R. § 42.104(b)(3) for the means-plus-function claim terms because it is not necessary to reach a resolution in this matter. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999). For the purposes of this Decision, we determine no claim terms require express construction.

D. Petitioner's Rationale for Combining Gurantz and Grube in the Manner Recited Is Deficient

Challenged independent claims 1–7, 14, and 20–22 all recite "a plurality of nodes in a broadband cable network that includes "a transmitting

node" that: (1) "transmit[s] a probe signal" to "receiving nodes"; (2) "receiv[es] a plurality of response signals" that include "a bit-loading modulation scheme determined by a corresponding receiving node"; and (3) "determin[es] [a] common bit-loading modulation scheme from the received plurality of response signals." Ex. 1001, 12:28–41, 12:61–13:6, 13:29–41, 13:65–14:13, 14:39–55, 15:1–16, 15:34–51, 17:13–31, 18:21–39, 19:1–14, 19:40–20:7. Each ground in this Petition therefore, either directly or indirectly, depends on Petitioner's contention that it would have been obvious to modify a node in Gurantz, in view of Grube, to transmit a probe signal to the other respective nodes and determine a common bit-loading modulation scheme from the various bit-loading modulation schemes determined and provided by each of the other respective nodes that received a probe signal. *See* Pet. 25–38, 40–43, 45–48, 52, 53, 55–56, 57–58, 61, 64, 65, 69. 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 institution of *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 Gurantz and Grube.

1. Gurantz (Ex. 1007)

Gurantz, titled "Network Interface Device and Broadband Local Area Network Using Coaxial Cable," is directed to the use of "a frequency selective network interface device placed at the building point of entry (POE) to reflect upstream signals transmitted by terminal devices back into the building distribution whereby the signals may be received by other terminal devices." Ex. 1007, code (54), ¶ 13. Gurantz teaches that

"reflecting upstream signals back into the building as downstream signals" allows "the network interface device provides a path for terminal devices to transmit to and receive from other terminal devices." *Id.* ¶ 13. According to Gurantz, "[t]his overcomes the problem of port-to-port isolation in the signal splitter/combiners" because a "bidirectional signal distribution network is create[d] from existing building wiring intended only for headend to terminal device communication." *Id.* The network interface device also functions "to isolate signals generated within the building and prevent the transmission outside the building" and because of the "frequency selectivity of the network interface," the upstream and downstream signals for cable TV and cable modem service may not be disturbed. *Id.*

2. Grube (Ex. 1009)

Grube, titled "Method and Apparatus for Providing Infrastructure Call Support," is directed to providing "a one-to-many and/or many-to-one communication system infrastructure that utilizes existing telephone lines while providing the highly reliable service subscribers of wireless communication systems expect." Ex. 1009, code (54), 4:44–51. The solution, Grube teaches, is to configure a primary site with the ability to generate a lowest common denominator (LCD) call bit loading table for a particular call service. *Id.* at 8:22–37.

To generate this LCD call bit loading table, Grube describes the primary site as first transmitting a training signal to each of the plurality of secondary sites. Ex. 1009, 7:56–58. "The training signal is a [Discrete Multi-Tone (DMT)] symbol comprised of a plurality of signals modulated on the each of the carrier channels having a constant magnitude. *Id.* at 14:8–10. Grube explains that "[e]ach of the secondary sites calculate the bit

loading information from a spectral response of the output transmission path, wherein the bit loading information indicates, for each carrier channel, the number of bits that the carrier channel can support." *Id.* at 14:11–15. The secondary sites save the bit loading information for each carrier channel into an outbound bit loading table. *Id.* at 15:15–17. The primary site then issues a request to the secondary sites to collect each of the outbound bit loading tables created. *Id.* at 14:3–19, 16:38–44. Once the primary site has received the requested outbound bit loading tables from the respective secondary sites, Grube may generate an LCD call bit loading table. Ex. 1009, 14:33–35. To do so, Grube details that the primary site generally "determin[es], for each carrier channel within the bit loading tables, a lowest bit loading value, having obtained the lowest value for each carrier channel, a lowest common denominator (LCD) outbound control channel bit loading table is generated." *Id.* at 14:35–39.

Grube discloses that the primary site utilizes the LCD bit loading table to "select[], based on bandwidth requirements of the control channel, at least one carrier channel to act as the outbound control channel." Ex. 1009, 14:39–43, 18:33–35. After selecting the outbound control channel, "the primary site transmits a signal to all the secondary sites indicating the carrier channel allocations as the control channel" and "[i]n general, the outbound control channel is used to transmit control information from the primary site to the plurality of secondary sites." *Id.* at 18:35–41. And, "[h]aving transmitted the control channel message to the secondary sites, the process is complete." *Id.* at 18:41–43.

3. Petitioner Does Not Demonstrate Sufficiently That a Skilled Artisan Would Have Combined the Teachings of Gurantz and Grube in the Manner Claimed

Petitioner relies on Gurantz to teach the use of a bit-loading modulation scheme to communicate between a plurality of nodes within a broadband cable network (BCN). Pet. 22–24. In Gurantz's Figure 2 illustration of a local area network (LAN) using coaxial cable wiring for interconnection of terminal devices, Petitioner identifies each of the representative pairs of LAN modem (270)/LAN device (280, 282) as corresponding to a respective one of the '759 patent's node/customer premises equipment (CPE) pairs. *Id.* at 22–23 (citing Ex. 1007, code (57), ¶¶ 13, 20, Fig. 2). Petitioner notes that "[b]it-loading was known for carrying out multi-carrier modulation [techniques]," such as discrete multi-tone (DMT) and orthogonal frequency division multiplexing (OFDM), and that Gurantz discloses using OFDM to "provide[] a mechanism to overcome the frequency selective channel impairments present in coaxial building wiring when employing a network interface device." *Id.* at 23–24 (citing Ex. 1007 ¶¶ 46–48; Ex. 1002 ¶ 113).

Petitioner acknowledges, however, that Gurantz does not disclose a node transmitting probe signals to other respective nodes to determine a common bit-loading modulation scheme from the various bit-loading modulation schemes determined and provided by each of the other respective nodes that received a probe signal. *Id.* at 24 ("Gurantz does not disclose that its determined bit-loading modulation scheme is a 'common' scheme"), 25 ("Gurantz does not disclose . . . transmitting a probe signal from the transmitting node to the sub-plurality of receiving nodes in connection with carrying out its bit-loading"), 27–28 ("Gurantz . . . does not

specifically describe [a bit-loading modulation] scheme being determined by a corresponding receiving node and included in a plurality of received response signals (responsive to the transmitted probe signal)"), 34 ("Gurantz . . . does not detail [a bit-loading modulation] scheme being determined by a corresponding receiving node and included in a plurality of received response signals (responsive to the transmitted probe signal), and determining a *common* bit-loading modulation scheme as recited").

For what Gurantz admittedly does not disclose, Petitioner turns to Grube's disclosure. *See* Pet. 28–32, 34–35. In particular, Petitioner relies on Grube's disclosed solution for providing "a one to-many and/or many-to-one communication system infrastructure that utilizes existing telephone lines while providing the highly reliable service subscribers of wireless communication systems expect." Ex. 1009, 4:44–51. According to Petitioner, the relevant portions of Grube's solution

> teach[] in detail a *common* bit-loading methodology for use in a multicast scenario where the same data (e.g., control data) is to be transmitted simultaneously to multiple receiving nodes. Therein, multiple receiving nodes ("secondary sites") of a communication network determine and inform a transmitting node ("primary site") of a bit-loading scheme (table) for the respective receiving node, responsive to receiving the probe ("training") signal sent by the transmitting node.
>
> The tables are compared by the primary site (transmitting node) in order to determine a *common* bit-loading scheme for outgoing multi-carrier data transmissions, which Grube terms lowest common denominator (LCD) bit-loading.

Pet. 28 (citing Ex. 1009, 14:3–19, 14:64–15:5, 17:10–45, 18:44–19:26, Figs. 12, 15, 17; Ex. 1002 ¶¶ 128–129).

Petitioner contends a skilled artisan "would have recognized that Grube's teachings for improving bit-loaded data transmission over a network

utilizing two-wire (e.g., twisted pair) telephone line would have similar application, with similar benefits, as applied to Gurantz's BCN employing coaxial cable" and "would have considered the concerns with transmission impairments, and the advantages obtainable through the use bit-loading, to be largely common between the two." Pet. 27 (citing Ex. 1002 ¶¶ 121–124). Modifying the node operations in Gurantz's disclosed system to employ Grube's teachings concerning a common bit-loading scheme would have been obvious to a skilled artisan according to Petitioner for the following reasons.

First, "Grube presents an improvement over the known use of bit-loading, extending it to provide an architecture that allows for 'one-to-many and/or many-to one' communications, i.e., a multi-cast scenario. Combination with Gurantz would have been motivated in order to achieve a similar improvement in data networking over coaxial cable." Pet. 32 (citing Ex. 1009, 4:43–50; Ex. 1002 ¶ 135). Second, "the combination would have been motivated by the benefits expressly taught in Grube, e.g., optimizing communications for the case of multi-cast data communications." *Id.* at 32–33 (citing Ex. 1009, 4:43–51, 17:20–40; Ex. 1007 ¶ 50; Ex. 1002 ¶ 136). Third, a skilled artisan "would have recognized Grube's approach to be similarly beneficial in the Gurantz BCN, for multicast/broadcast transmissions from a transmitting node to plural receiving nodes. This includes a scenario where a transmitting node of Gurantz includes a PC that broadcasts data to the plural receiving nodes." *Id.* at 33 (citing Ex. 1002 ¶¶ 137–138; Ex. 1007 ¶ 20, Fig. 2; Ex. 1009, 11:29–51, Fig. 9). Lastly, Petitioner contends that:

> Applying Grube to Gurantz in this manner would have been nothing more than combining prior art elements—Gurantz's

> bit-loading BCN network, with Grube's system of comparing determined bit-loadings of multiple receiving nodes to arrive at a common bit-loading scheme—according to known methods (as taught in Gurantz and Grube). This would have yielded the predictable result of a BCN advantageously employing common bit-loading for plural transmission paths in a multi-cast or broadcast scenario.

Id. (citing Ex. 1002 ¶ 139); *see also id.* at 37 (citing Ex. 1002 ¶ 146).

In addition to disputing whether Grube is analogous art and whether Grube discloses nodes determining a bit-loading modulation scheme or that send a probe signal (Prelim. Resp. 6–38), Patent Owner argues that "Petitioner fails to demonstrate a [skilled artisan] would be motivated to combine Gurantz and Grube as proposed or could do so with a reasonable likelihood of success." Prelim. Resp. 38. Patent Owner summarizes its argument as follows:

> Gurantz is concerned with issues relating to a BCN employing coaxial cable. Grube is fundamentally different and concerns a twisted pair telephonic system on a citywide scale. Petitioner fails to prove that a [skilled artisan] would be motivated to combine such disparate references. And these significant differences are consequential. Petitioner's combination posits that one of Gurantz's nodes could be employed as Grube's primary site. But, Grube's primary site is the headend for a citywide telephonic system; no explanation is given for why or how a [skilled artisan] could reconfigure one of Gurantz's nodes to function as Grube's headend. Even if that could be overlooked, Petitioner fails to identify any fashion in which Gurantz would benefit from the proposed combination. Indeed, the problems Grube addresses were addressed in coaxial cable years before Gurantz. Worse still, the combination would be inoperable because Grube's low-frequency transmissions would be filtered out by Gurantz's frequency-selective reflector. Fundamentally, Petitioner's combination is driven only by hindsight.

Id. at 39–40.

Patent Owner highlights the differences between Gurantz and Grube. In Patent Owner's words: "Gurantz and Grube are directed toward fundamentally different systems with different solutions for different problems specific to the type of connections that are employed in Gurantz (coaxial cable in a BCN) and Grube (twisted pair telephonic system), respectively." Prelim. Resp. 40; *see also id.* at 41–42 (citing Ex. 2003 ¶¶ 88–90; Ex. 1007, code (57), ¶¶ 2–3, 12; Ex. 1009, 1:44–47, 7:9–12, 7:20–22, 8:46–49, 9:61–66, 12:56–57, 13:61–63; Ex. 2005, 1). Patent Owner's declarant, Dr. Russ, adds

> systems using coaxial cable and systems using phone lines/twisted pair wires are fundamentally different. The difference between cable and a phone line, even at the time of the '759 patent, was profound. A single phone line carried signal energy up to about 1 MHz and, according to Grube, this led to about 10 Mbit/s of data capacity. Ex. 1009 [Grube] 3:7-10. By contrast, a single cable line on an 860 MHz cable plant carried about 125 6-MHz channels. A single 6-MHz channel can carry 38 Mbit/s using the DOCSIS standard (and 256-QAM modulation). Thus, this single cable could carry 4,750 Mbit/s or about 475 times the data capacity of Grube's twisted pair wire. A [skilled artisan] would not be motivated to improve signaling on coaxial cable via Grube's far more primitive twisted pair system.

Prelim. Resp. 41–42 (citing Ex. 2003 ¶ 90). As another "crucial difference," Patent Owner emphasizes that

> Grube has a citywide focus and concerns the interface between a citywide primary site at the headend and an entry point with particular buildings, Gurantz concerns local networks, e.g., within a home, and communications within that network amongst consumer premises equipment within that home, which Grube is entirely unconcerned with. Grube's secondary sites are, moreover, one step removed from the nodes that are the subject of the '759 patent.

Id. at 42–43 (citing Ex. 2003 ¶ 94).

Petitioner's attempts to minimize these difference "fall flat," Patent Owner argues, because no evidence supports Petitioner's contention that Grube's teachings "would have similar application, with similar benefits" when applied to Gurantz's BCN. Prelim. Resp. 43–44. And Patent Owner asserts that Petitioner's declarant, Mr. Bertonis, likewise is "of no help" because he too offers no evidence; instead, Mr. Bertonis only offers conclusory statements regarding the alleged similarities. *Id.* at 44 (citing Ex. 1002 ¶¶ 121–124). Patent Owner counters with Dr. Russ's explanation of why "the 'transmission impairments,' 'interference and signal reflections' that Mr. Bertonis argues are similar between Grube and Gurantz are, in fact, not similar at all." *Id.* Dr. Russ explains:

> The physical differences between coaxial cable and twisted pair systems manifest themselves in the different problems each system faces. As seen in Gurantz (and the '759 patent), the higher frequency transmission results in shorter wavelengths, which in turn cause negative transmission-line effects, even inside buildings. Ex. 2004, 94-96, 99-101. Consequently, devices on a local coaxial cable network have a difficult time communicating with each other. Ex. 1007 ¶ 12 (Gurantz "addresses the problem of tap port-to-port isolation and providing a suitable signal path for terminal-to-terminal communication in a coaxial cable wired building.").
>
> Grube's twisted-pair system, by contrast, does not face this problem. The twisted pair wire's transmission frequency is lower, and thus, its wavelength is longer. The negative transmission-line effects seen in coaxial cable networks are simply not seen in twisted-pair wiring. This lower transmission frequency, however, means that twisted pair wiring cannot carry enough information to distribute information to multiple users. In accord, Grube addresses a need "for a one-to-many and/or many-to-one communication system infrastructure that utilizes existing telephone lines." Ex. 1009, 4:47-51. Coaxial

> cable's higher frequency has no such problem. A [skilled artisan] simply would not consider solutions meant for twisted pair wiring's lack of bandwidth to be relevant to the problem of coaxial cable's transmission-line effects within buildings.

Id. at 45 (citing Ex. 2003 ¶¶ 92–93).

Patent Owner also criticizes Petitioner's alleged motivating benefits as being "either already present in or irrelevant to Gurantz's system." Prelim. Resp. 57. Patent Owner argues Petitioner fails to establish that any of the proposed modifications to Gurantz's system, in view of Grube, would provide a discernible benefit to Gurantz's system. *Id.* at 52.

Regarding furthering "Gurantz's objective of overcoming 'frequency selective channel impairments'" (Pet. 26), Patent Owner calls out that "Gurantz teaches that 'OFDM provides a mechanism to overcome the frequency selective channel impairments present in coaxial building wiring when employing a network interface device according to the present invention." Prelim. Resp. 52 (quoting Ex. 1007 ¶ 48). Similarly, addressing Petitioner's contention the proposed modification comes from wanting Gurantz's system to allow for "one-to-many and/or many-to-one communications" (Pet. 32–33), Patent Owner, with the support of Dr. Russ, identifies that Gurantz "is already capable of the one-to-many and many to-one communications." Prelim. Resp. 53. Dr. Russ explains why Gurantz already teaches a multi-cast scenario that includes one-to-many communications from the point of entry to the nodes, and that the pathways are bi-directional to allow for many-to-one communications. Ex. 2003 ¶ 106 (citing Ex. 1007 ¶¶ 4, 5, 13, Figs. 1, 2); *see also* Prelim. Resp. 53–56. And, finally, Patent Owner characterizes Petitioner's alleged improvements to Gurantz's bit-loaded data transmissions as being unsubstantiated. Prelim. Resp. 56. As support, Dr. Russ explains that

> Although Petitioner argues that Grube's invention improved bit-loaded data transmission, Grube did not actually present an improvement in the use of bit-loading. Rather, Grube re-architects an ADSL over twisted-pair telephonic system to include "one-to-many and/or many-to-one" communications. Ex. 1009 [Grube] 4:44-51. Grube says nothing about improving bit-loading. *See generally id.* Rather, Grube's system is designed to efficiently allocate bandwidth for given calls in view of the limited bandwidth (1.1 MHz) available in Grube's twisted-pair telephone lines while also minimizing channels for any given call so that Grube's system can accommodate the ever-shifting needs of its dense citywide system. But neither of these is a concern in the context of Gurantz [because] Gurantz's BCN accommodates far higher bandwidths [and] . . . Gurantz's local BCN has no need to balance the competing and ever-shifting needs of the very large number of sites serviced by a citywide network like that disclosed in Grube.

Ex. 2003 ¶ 107.

After studying the contentions and arguments presented by both parties, in view of the evidence of record, we are not persuaded Petitioner has shown with sufficient particularity why a skilled artisan would have modified nodes in Gurantz's disclosed BCN, in view of Grube, to perform the recited operations for determining a common bit-loading modulation scheme from received response signals sent by other nodes, which each include a bit-loading modulation scheme determined by the respective node. As Patent Owner observes, when considering what Gurantz and Grube teach as a whole, Petitioner's proposed reasons for such a modification of Gurantz's disclosed BCN are largely unsubstantiated, weak, and/or improperly relying on hindsight reasoning.[4]

[4] For our purposes here, we accept Petitioner's contentions that Grube is prior art that discloses or suggests a node determining a common bit-loading

With regard to Petitioner's suggestion that a skilled artisan would have viewed Grube's common bit-loading scheme as providing improvements over and benefits to the Gurantz system's ability to multi-cast information, we agree with Patent Owner that this contention is unsubstantiated. Although there is sufficient evidence that Grube's common bit-loading scheme improves upon and benefits infrastructures utilizing telephone lines, Petitioner provides no basis, or minimal at best, to bridge those advantages obtained in the context of Grube's system to Gurantz's BCN. The evidence Petitioner cites from Grube and Mr. Bertonis (Ex. 1009, 4:43–51, 17:20–40; Ex. 1002 ¶¶ 135–136) either describes how Grube's bit-loading scheme works in an infrastructure utilizing telephone lines or it represents that the bit-loading scheme is able to satisfy the need for a one-to-many and/or many-to-one communication system within an infrastructure that utilizes existing telephone wires. Moreover, Mr. Bertonis's testimony provides little, if any, persuasive information to bridge the gap between how Grube's bit-loading scheme's usefulness within a telephone line infrastructure translates to a skilled artisan into adding similar value within a BCN infrastructure; instead, Mr. Bertonis largely mirrors the naked assertions Petitioner makes and cites to the same evidence without further substantive reasoning. *See* 37 C.F.R. § 42.65(a) ("Expert testimony that

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modulation scheme from a plurality received response signals that each include a respective bit-loading modulation scheme determined by a separate node. To be clear, "we accept" these contentions about what Grube discloses without making a determination about whether the evidence of record supports such a finding in order to focus our analysis on the dispositive issue, which is whether, in view of Grube, Petitioner demonstrates sufficiently a rationale with a rational underpinning for modifying the nodes in Gurantz's BCN system in the manner claimed.

does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

Left unfulfilled is any clear explanation for why or how Grube's bit-loading scheme would have actually improved or benefited Gurantz's system, which Petitioner admits already teaches a bit-loading modulation scheme for communicating between plural nodes in a BCN (Pet. 22). For example, Petitioner does not identify a single known shortcoming with Gurantz's one-to-many and/or many-to-one communication system infrastructure that a skilled artisan would recognize may be overcome with Grube's bit-loading scheme. Nor does Petitioner explain why or how a skilled artisan would have viewed Grube's bit-loading scheme to improve upon the bit-loading schemes utilized by Gurantz to form a multi-casting infrastructure.

On the other hand, Gurantz teaches that its multi-casting communication infrastructure (which is OFDM) "provides a mechanism to overcome the frequency selective channel impairments present in coaxial building wiring." Ex. 1007 ¶ 48. This uncontradicted evidence further weakens Petitioner's position because it shows Gurantz's infrastructure already accomplishes the same goal that Petition proposes a skilled artisan would have sought to achieve through the proposed modification. *In re NTP, Inc.*, 654 F.3d 1279, 1299 (Fed. Cir. 2011) (stating that the Board's reasoning for the proposed modification was "further weakened" by the fact that the primary reference already discloses the objective sought to be obtained).

The last point we will make about Petitioner's reasoning is that it lacks any substantive support for why a skilled artisan would have chosen to

configure Gurantz's node to have the functionality Grube describes for its primary site. Here again, Petitioner simply concludes that a skilled artisan would have found it obvious to have Gurantz's nodes act as Grube's primary site without any evidence that such a correlation was known by skilled artisans or any analysis regarding the roles Gurantz's nodes and Grube's primary site play within their respective infrastructures that would have led to that choice. Pet. 35–37. We are mindful that "[c]are must be taken to avoid hindsight reconstruction by using 'the patent in suit as a guide through the maze of prior art references, combining the right references in the right way so as to achieve the result of the claims in suit.'" *Grain Processing Corp. v. American–Maize Prods. Co.*, 840 F.2d 902, 907 (Fed.Cir.1988) (quoting *Orthopedic Equip. Co. v. United States*, 702 F.2d 1005, 1012 (Fed. Cir. 1983)). Petitioner's failure to provide any clear explanation backed by supporting evidence for why a skilled artisan would have selected Gurantz's nodes to modify and perform as the primary site when implementing Grube's bit-loading scheme suggests Petitioner improperly relied on hindsight reasoning to piece together elements to arrive at the claimed invention.

For the above reasons, we are not persuaded that Petitioner has shown with sufficient particularity why it would have been obvious to modify a node in Gurantz, in view of Grube, to transmit a probe signal to the other respective nodes and determine a common bit-loading modulation scheme from the various bit-loading modulation schemes determined and provided by each of the other respective nodes that received a probe signal. And as a result, we find Petitioner has not demonstrated a reasonable likelihood of proving that one of ordinary skill in the art would have been motivated to

combine Gurantz and Grube as proposed. This failing undermines Petitioner's showing as to independent claims 1, 4, 7, 20, and 21 (in the asserted ground of Gurantz and Grube) and as to the independent claims 2, 3, 5, 6, and 22 (in the asserted ground of Gurantz, Grube, and Gesbert). The same deficiency extends through to all of the dependent claims challenged in all of the grounds.

IV. CONCLUSION

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 '759 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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