

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

COMCAST CABLE COMMUNICATIONS, LLC,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

CASE: IPR2025-00183
U.S. PATENT NO. 9,866,438

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

I. INTRODUCTION	1
II. SUMMARY OF THE '438 PATENT	5
A. Background of the '438 Patent.....	5
B. Claim Construction.....	13
III. THE PETITION FAILS TO SHOW THAT THERE IS A REASONABLE LIKELIHOOD THAT THE PETITIONER WILL PREVAIL ON A SINGLE CLAIM.....	14
A. Ground A: The Proposed Combination of Cooper-Cooper840 Fails to Render Obvious the Challenged Claims	14
1. Overview of the Asserted Prior Art.....	16
2. The Proposed Combination Fails to Render Obvious the “Generating” Step [1D]	22
3. The Proposed Combination Fails to Render Obvious the “Selecting” Step [1E].....	26
4. A POSITA Would Not Be Motivated to Combine Cooper and Cooper840 as Proposed in the Petition	36
5. The Proposed Combination Fails to Render Obvious the Other Challenged Claims Because It Fails to Render Obvious Claim 1	37
B. Ground B: The Proposed Combination of Cooper-Azenkot Fails to Render Obvious the Challenged Claims	37
1. Overview of Azenkot (Ex. 1031).....	38
2. The Proposed Combination Fails to Render Obvious the “Generating” Step [1D]	40
3. The Proposed Combination Fails to Render Obvious the “Selecting” Step [1E].....	45
4. A POSITA Would Not Be Motivated to Combine Cooper and Azenkot as Proposed in the Petition.....	46
5. The Proposed Combination Fails to Render Obvious the Other Challenged Claims Because It Fails to Render Obvious Claim 1	46

C. Grounds C-L: The Proposed Combinations in These Backup Grounds All Rely on Cooper-Cooper840 or Cooper-Azenkot, which Fail to Render Obvious the Challenged Claims	47
1. Grounds C-F Do Not Remedy the Failures in Grounds A and B	47
2. Grounds G-L Adding Currivan Have All the Same Problems as Grounds A and B.....	48
IV. CONCLUSION.....	54

TABLE OF AUTHORITIES

Cases

<i>Apple Inc. v. Firstface Co.</i> , No. 2021-1001, 2021 WL 4156323 (Fed. Cir. Sept. 13, 2021).....	13
<i>Hartness Int’l Inc. v. Simplimatic Eng’g Co.</i> , 819 F.2d 1100 (Fed. Cir. 1987)	5
<i>Phillips v. AWH Corp.</i> , 415 F.3d 1303 (Fed. Cir. 2005)	13

PATENT OWNER'S LIST OF EXHIBITS

Exhibit No.	Description
Ex. 2001	U.S. Patent No. 10,135,682 (“the ’682 Patent”)
Ex. 2002	Certified File History of U.S. Patent No. 10,135,682
Ex. 2003	PTAB Multiple Petitions Study Executive Summary (FY 2021-FY 2022 Update)
Ex. 2004	PTAB Multiple Petitions Study (FY 2021-FY 2022 Update)
Ex. 2005	Ryan Davis, <i>Acting USPTO Leader Says New Policies Will Bolster Patents</i> , published by Law360 (Apr. 1, 2025)
Ex. 2006	Table of Parallel Petitions Filed by Comcast (As Petitioner or RPI) (2016-2025)
Ex. 2007	<i>Entropic Communications, LLC v. Comcast Corp.</i> , 2:23-cv-01050, Dkt. 1 (C.D. Cal. Feb. 10, 2023) (Complaint for Patent Infringement)
Ex. 2008	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 95 (C.D. Cal. Oct. 16, 2023) (Order Granting Stipulation to Consolidate Cases)
Ex. 2009	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 114 (C.D. Cal. Nov. 13, 2023) (Motion for Leave to Amend)
Ex. 2010	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 143 (C.D. Cal. Dec. 15, 2023) (Motion for Leave to Amend)
Ex. 2011	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 143-3 (C.D. Cal. Dec. 15, 2023) (Redacted Proposed 3d Amended Complaint Against Comcast)

Exhibit No.	Description
Ex. 2012	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 143-24 (C.D. Cal. Dec. 15, 2023) ('438 Patent Exemplary Infringement Chart)
Ex. 2013	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 277 (C.D. Cal. Mar. 6, 2024) (Special Master's Report and Recommendation)
Ex. 2014	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 366 (C.D. Cal. Feb. 12, 2025) (Order Conditionally Granting Comcast's Motion to Stay)
Ex. 2015	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 367 (C.D. Cal. Feb. 21, 2025) (Notice by Cox)
Ex. 2016	<i>Entropic Communications, LLC v. Cox Communications, Inc.</i> , 2:23-cv-01049, Dkt. 371 (C.D. Cal. Mar. 7, 2025) (Joint Report)
Ex. 2017	Lex Machina Court Statistics for Judge Holcomb (accessed Apr. 27, 2025)
Ex. 2018	USPTO Guidance on USPTO's Recission of "Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation" (March 24, 2025) ("March 24, 2025 Guidance")
Ex. 2019	USPTO Memorandum re Interim Processes for PTAB Workload Management (March 26, 2025) ("March 26, 2025 Memorandum")
Ex. 2020	Reserved

I. INTRODUCTION

Patent Owner, Entropic Communications, LLC (“Entropic” or “PO”), submits this Patent Owner Preliminary Response pursuant to 37 C.F.R. § 42.107(a) to the *Inter Partes* Review petition (“Petition”) filed by Comcast Cable Communications, LLC (“Comcast” or “Petitioner”) for claims 1-18 (the “Challenged Claims”) of U.S. Patent 9,866,438 (the “’438 Patent”). The Board should deny institution.

Cable operators are faced with a number of issues and goals in managing cable modems across a given section of a network. Optimal utilization of cable television networks is one of those goals, yet cable networks are not uniform in their capacity at any given time. *E.g.*, Ex. 1001 (“the ’438 Patent”), 1:56-57. A cable modem termination system (“CMTS”) is part of a cable operator’s network infrastructure, serving cable modems (“CMs”) at customer premises to provide connections to the network and on to the internet. A CMTS may manage hundreds or even thousands of cable modems located at subscribers’ premises, all of which could experience unique and varying signal/channel strengths and network conditions.

The ’438 Patent discloses systems and methods to address the variability in signal/channel strengths and network conditions to permit “communication parameters (throughput, reliability, etc.)” that are “optimal, or near-optimal, for all of the CMs in the service group.” *Id.*, 5:44-48. Specifically, the ’438 Patent teaches a way of grouping cable modems according to “signal-to-noise ratio” (“SNR”)-

related metrics (which indicate channel quality) and tailoring physical layer communication parameters (such as the number of bits that can be sent in a frame) to each group. The '438 Patent discloses that the CMTS manages this grouping, which determines a plurality of SNR-related metrics for a plurality of CMs served by the CMTS, assigns CMs to a service group based on that plurality of SNR-related metrics, generates a composite SNR-related metric corresponding to a service group that is based at least in part on a worst-case SNR profile, selects physical layer communication parameters for that service group based on the composite SNR-related metric, and then communicates with CMs in that service group using those selected communication parameters. Unlike other techniques to address signal/channel and network variability across CMs, the invention of the '438 Patent permits communication with all CMs in a service group that is designed to optimize throughput and minimize unused headroom for the entire service group, not just a subset of CMs in the group.

Petitioner, however, asserts prior art across three different IPR Petitions that take fundamentally different approaches to the tailoring of communication parameters to a group of CMs that is central to the '438 Patent. And, rather than tailor those communication parameters to an entire group, the prior art of the Petition sacrifices a few lower-performing CMs to boost the performance of the higher-performing CMs in the group. How does that prior art propose to address the lower

performers, then? By truck rolls and on-site technician repairs—the very problems made largely unnecessary by the '438 Patent.

In this Petition and in the “lower-ranked” ones in IPR2025-00184 and IPR2025-00185, Petitioner attempts to twist the disclosures of the prior art to make it sound more like the challenged claims of the '438 Patent. In more than one way Petitioner and its expert fail to accurately describe the cited references, meaning neither address the stark differences between the cited references and the requirements of the challenged claims of the '438 Patent. Those unaddressed differences lead to Petitioner failing to meet its burden for institution.

The problems with Petitioner’s references are common across Petitions: its primary references (Cooper here; Prodan in -184; Thibeault in -185) are focused on assignment of cable modems to “logical channels” or “categories” based on modems’ individual characteristics, and its secondary references (Cooper840, Azenkot, and Currivan in all three petitions) are fundamentally unconcerned with tailoring of communication parameters to a group of CMs, instead focusing on individual CM performance or creating test elements to exclude CMs from consideration by sacrificing them, so to speak. None of these references recognized the problem that the '438 Patent recognized or solved it with the methods and systems recited in the '438 Patent claims.

Petitioner admits that its primary reference here, Cooper, does not disclose the “based at least in part on a worst-case SNR profile” requirement of element [1D] of the challenged claims. But, contrary to Petitioner’s arguments, Petitioner’s new secondary references fail to fill the gap in Cooper that Petitioner concedes exists, just like the secondary references Petitioner cited in challenging the related ’682 Patent. *See* Paper 8 (Patent Owner’s Brief in Support of Discretionary Denial), at 8-13, 31-32. Rather than generating a composite metric based at least in part on a “worst-case” performer in a group, each of Cooper840, Azenkot, and Currivan essentially *sacrifice* the worst-case performers for the benefit of the rest of the group. Cooper840 maintains communication parameters that can only be met by a subset of the members of its groups and—contrary to the solutions provided by the ’438 Patent claims—relies on truck rolls and in-person technician visits to attempt to bring the poor performers up to speed. Azenkot simply excludes the poor performers from its groups by reassignment so that it does not have to deal with them. And Currivan combines those two approaches: it reassigns a poor performer to a higher-performing group but decreases the individual communication parameters of that poor performer so it does not drag down the rest of the group. None of these approaches match up to the challenged claims, and Petitioner’s primary reference Cooper is insufficient on its own, by Petitioner’s own admission. Petitioner therefore has failed to meet its burden for institution.

In sum, each Ground fails to render obvious the claimed “generating” [1D] and “selecting” [1E] elements of independent claim 1 (mirrored in [10D] and [10E] of independent claim 10). Accordingly, the Petition fails to articulate a *prima facie* case of obviousness for all challenged claims of the ’438 Patent.

Because all of the grounds fail to render obvious the independent claims of the ’438 Patent, the entirety of the Petition should be rejected. *See Hartness Int’l Inc. v. Simplimatic Eng’g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987) (prior art that fails to demonstrate an independent claim as unpatentable similarly fails to demonstrate a dependent claim as unpatentable).

II. SUMMARY OF THE ’438 PATENT

A. Background of the ’438 Patent

A common measure of cable network channel performance is signal-to-noise ratio (“SNR”), or a variety of SNR-related metrics in either the analog or digital domain. Higher SNR (more signal than unwanted noise) means better channel performance and enables a provider to utilize more demanding physical layer communication parameters for faster or more efficient communication between the provider and customer equipment. On the other hand, lower SNR is characterized by more noise compared to the signal and would result in lower channel performance, more disruption of the signal, and consequently a requirement for use of less demanding (*i.e.*, less efficient or “slower”) physical layer communication

parameters.

Traditionally, a cable operator may have used the same physical layer communication parameters for all of the cable modems served by a given CMTS, which would require the cable modems capable of better performance to be slowed down by use of parameters that are usable by the worst performing cable modems. *E.g.*, '438 Patent, 5:48-67. For example, in a system where a CMTS serves three modems, if one modem had sufficient channel quality to support a more demanding communication parameter (*e.g.*, 64-QAM on a hypothetical channel z), but the other two only had sufficient channel quality to support a less demanding communication parameter (*e.g.*, 16-QAM on channel z (a 50% less efficient¹ modulation scheme than 64-QAM)), all three would be forced to use 16-QAM on channel z. *Id.*, 5:56-67. This still may leave a great deal of unused headroom for the best performing cable modems (which may result in slower service for some subscribers who could otherwise receive faster service).

The '438 Patent provides a method for CMTS management of cable modems allowing more precise, granular usage of physical layer communication parameters tailored to the modems' actual performance capabilities and makes use of otherwise

¹ 16-QAM provides 4 bits per symbol, whereas 64-QAM provides 6 bits per symbol, a 50% increase over 16-QAM.

wasted headroom in the modems' communication band with the CMTS.

The '438 Patent describes systems and methods for service group management in a cable television network whereby a CMTS determines SNR-related metrics of cable modems and assigns cable modems to service groups. Then for a given service group, the CMTS generates a composite SNR-related metric and uses it to select physical layer communication parameters for the service group. *See* '438 Patent, Abstract, 1:64-67; 4:37-64; *see also id.*, 5:4:25, 5:44-55, FIG.3A. The flow chart of Figure 3A describes, in part, the solution described above.

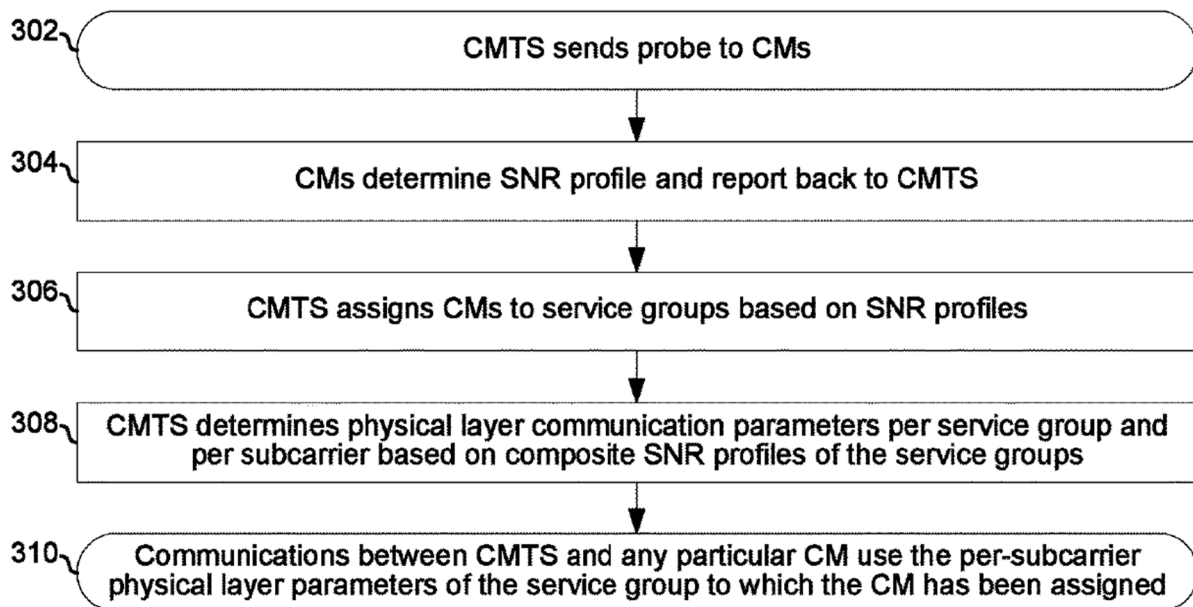
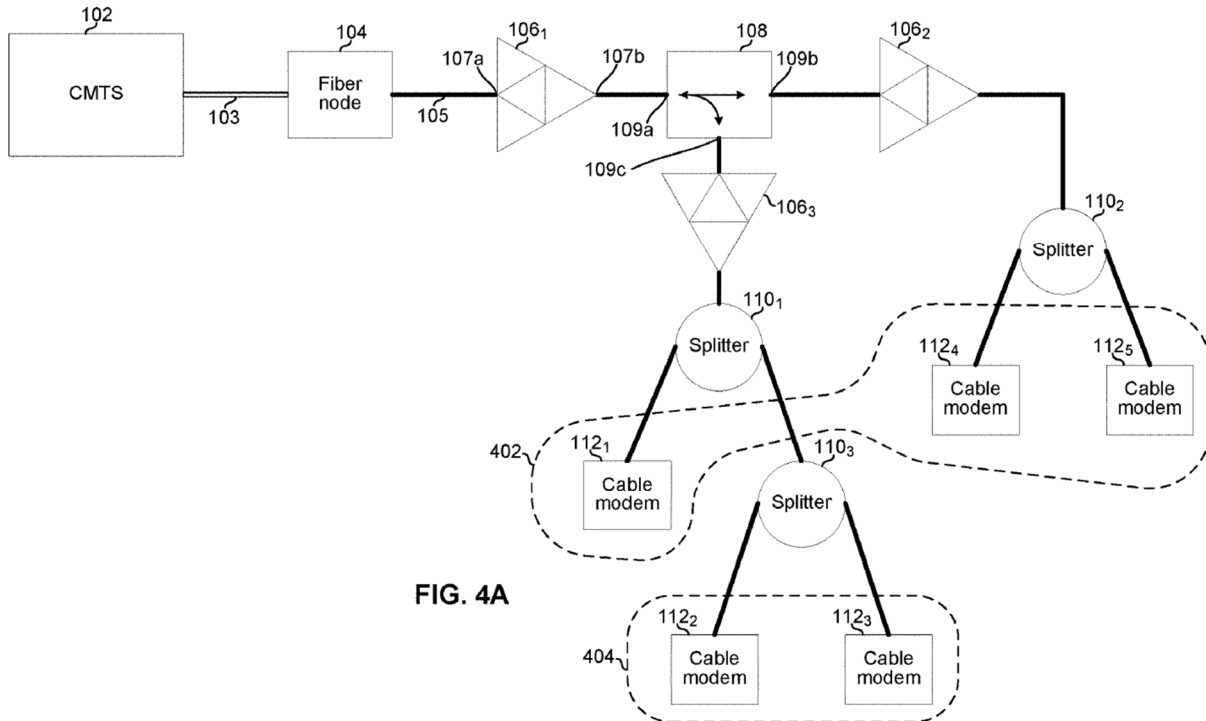


FIG. 3A

This inventive method configures the CMTS to treat cable modems in terms of their performance capabilities (i.e., how “good” or “poor” the channel conditions are from the CMTS to the cable modem). Thus the '438 Patent recognizes that physical

topology of the connection(s) may take a back seat to the actual, measured performance of the connection. This idea is illustrated in, e.g., Figure 4A, which shows cable modems grouped into group 402 and group 404 decided on the basis of connection performance, *without* regard to their location in the physical topology:



Id., Fig. 4A.

One illustration of an SNR versus frequency graph for an exemplary HFC network is shown in Figure 2B and uses eight channels/subcarriers (listed as sub1-sub8):

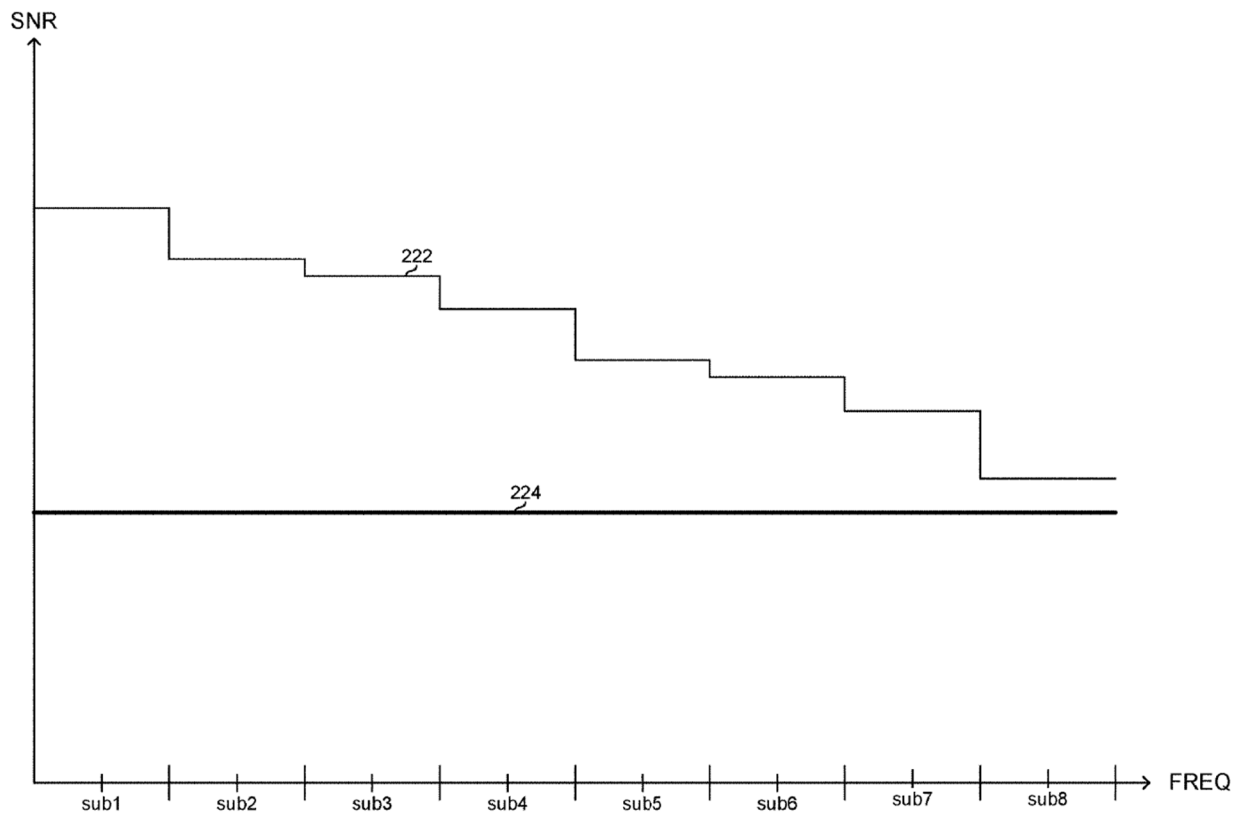


FIG. 2B

'438 Patent, 4:4-9, Fig. 2B. Here, line 222 (a "profile") represents an indication of available SNR across the eight different subcarriers (sub1 to sub8) for one or more CMs in the HFC network. *Id.*, 4:7-18. Line 224 represents the SNR level required for successful communication with the cable modem(s), given a certain set of modulation parameter choices. If the CMTS sets parameters so that the required SNR 224 is below the SNR available 222 for all subcarriers, successful communication with the cable modem(s) is expected. *Id.*, 4:17-21. However, as the '438 Patent observes, setting line 224 (by setting the associated communication parameters like modulation) uniformly is wasteful. This approach underutilizes the

available SNR of the channels, particularly (in this example) at channels on the left side (e.g., sub1-sub4).

Figure 2C illustrates a more-optimal way of communicating with CM(s) having the same SNR profile 222:

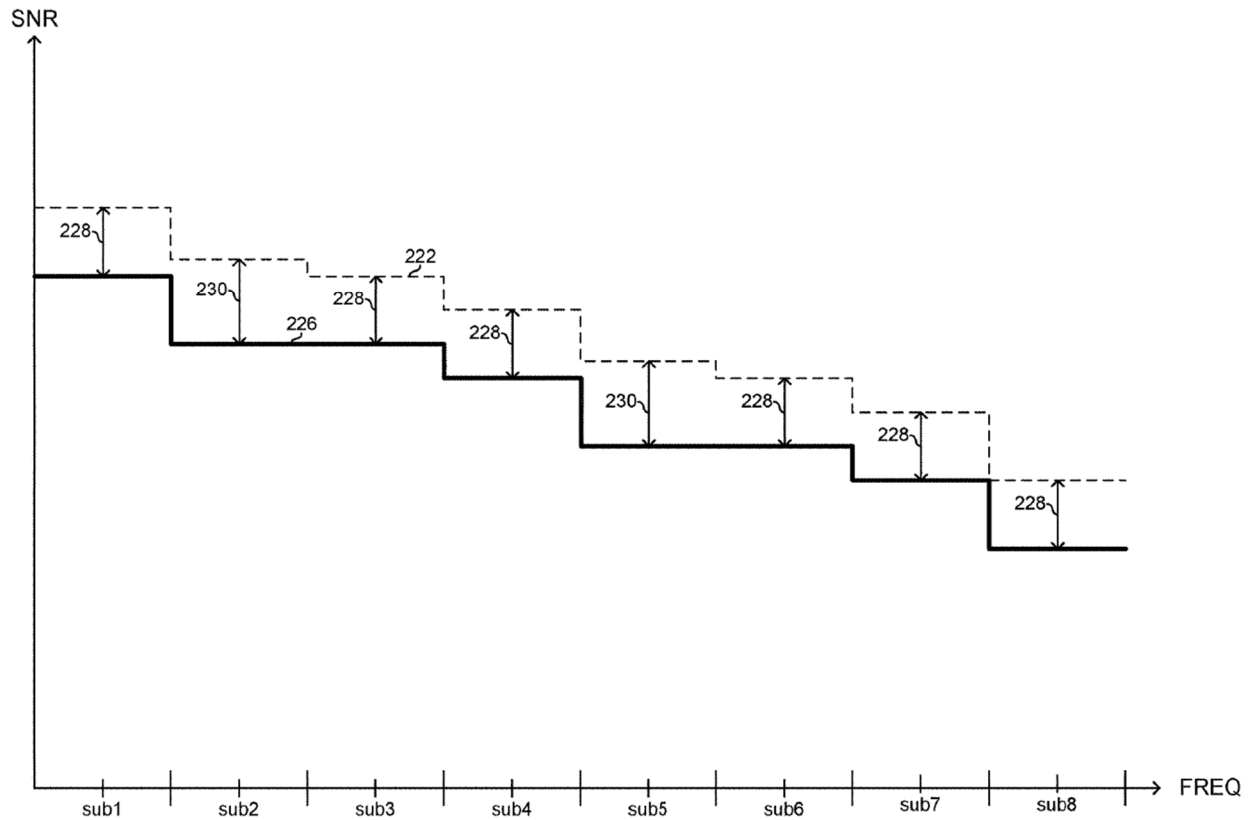


FIG. 2C

'438 Patent, Fig. 2C. Here, like in Fig. 2B, line 222 represents the applicable SNR profile for one or more CMs in an HFC network that uses eight channels/subcarriers (sub1-sub8). *Id.*, 5:4-9. Also like in Fig. 2B, solid line 226 represents the SNR utilized by a given choice of communication parameters. *Id.*, 5:10-18. Now, however, the parameters are chosen for less waste:

Assuming the distance 228 is the minimum desired headroom, then the physical layer communication parameters resulting in line 226 are nearly optimal in the sense that there is minimal headroom on each of channels/ subbands 1, 3, 4, 6, 7, 8, and only slightly more than minimal headroom on channels/subbands 2 and 5.

Id. That is, the parameters for each channel/subband (sub1-sub8) can be set differently, to more closely match the potential carrying capacity of the channel with the CM(s). Some headroom is built in as a margin of safety, but the physical communication parameters are now set to take better advantage of the available SNR for each subband. In this way, more data can be transferred over the same physical channel(s).

The '438 Patent also discloses that the above optimization may be performed for groups of cable modems called service groups. This management of cable modems and treatment at the group level allows for more advanced selection and assignment of communication parameters, allowing the operator to further utilize otherwise-wasted available headroom. Cable modems, such as those sufficiently similar in performance (*e.g.*, having similar available SNR), may be treated as a group, with physical communication parameters assigned to the group. This concept starts with sorting cable modems served by a CMTS into one or more groups, called service groups. *Id.*, 4:52-56. Once service groups are established, the CMTS selects

appropriate physical communication parameters for each group, which are then used for communications between the CMTS and the CMs of the group.

Claim 1 of the '438 Patent captures these concepts:

1. A method comprising:
determining, by a cable modem termination system (CMTS), for a plurality of cable modems served by said CMTS, a corresponding plurality of signal-to-noise ratio (SNR) related metrics;
assigning, by said CMTS, said plurality of cable modems among a plurality of service groups based on said plurality of SNR-related metrics;
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 plurality of SNR-related metrics corresponding to said one of said plurality of service groups;
selecting, by said CMTS, physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric; and
communicating, by said CMTS, with a portion of said plurality of cable modems corresponding to said one of said plurality of service groups using said selected physical layer communication parameters.

'438 Patent, cl. 1. Claim 1 is understood most easily as representing two classes of CMTS steps. The first class, represented by the first two elements, is about the CMTS assigning modems to groups. In [1B]² the CMTS characterizes the

² This Preliminary Response tracks Petitioner's mapping of shorthand references to the steps and elements of the challenged claims. See Petition at 80-84.

communication link with cable modems it serves by determining a plurality of SNR-related metrics. In [1C] the CMTS assigns the cable modems to service groups based on channel quality (indicated by the plurality of SNR-related metrics).

The second class is represented by the remaining three elements, where the CMTS works at the service group level. In [1D] the CMTS generates for a service group a composite SNR-related metric for that group. The CMTS uses this metric to select physical layer communication parameters for that service group in [1E]. And in [1F] the CMTS and CMs in that group communicate using the selected parameters. Claim 10, the other independent claim, recites a system with similar elements as claim 1, but further includes additional elements required by that system. *Compare id.*, cl. 10 *with id.*, cl. 1.

B. Claim Construction

The Petition was filed after November 13, 2018, and, as such, the proper claim construction standard to be applied is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), in accordance with its regulation, 37 C.F.R. § 42.100(b). *Apple Inc. v. Firstface Co.*, No. 2021-1001, 2021 WL 4156323, at *1 n.1 (Fed. Cir. Sept. 13, 2021).

Petitioner maps the preamble of claim 1 to “[1A],” therefore, following Petitioner’s convention, the “determining” step of claim 1 is “[1B].”

Petitioner does not contend that any terms should be given a specific construction. Petition at 16. Because none of Patent Owner's arguments below turn on a specific construction of any terms, Patent Owner agrees that all terms should be given their ordinary and customary meaning at this stage of the proceedings.

III. THE PETITION FAILS TO SHOW THAT THERE IS A REASONABLE LIKELIHOOD THAT THE PETITIONER WILL PREVAIL ON A SINGLE CLAIM

Each of Petitioner's Grounds (A through L) rest upon references having different principles of operation than those claimed in the '438 Patent. Petitioner and its expert, Dr. Kiaei, try to hide these fundamental differences by long, confusing paragraphs about the proposed combinations, but word count cannot cure the lack of substantive technical explanation. For the number of reasons explained below, Petitioner has failed to meet its burden on any of the many Grounds it asserts.

A. Ground A: The Proposed Combination of Cooper-Cooper840 Fails to Render Obvious the Challenged Claims

Petitioner's proposed combination in Ground A of Cooper and Cooper840 fails to demonstrate a likelihood of success for at least three reasons, each of which will be briefly mentioned before a detailed treatment in subsequent sections.

First, Petitioner concedes that Cooper does not disclose the "generating" step [1D] of claim 1 of the '438 Patent and thus relies entirely on Cooper840 for those elements. But unmentioned by Petitioner is that Cooper840 teaches *exclusion* of

poor-performing cable modems from its process to determine communication parameters. Cooper840 excludes those poor-performers to create a better-performing subset “testing” group to establish communication parameters, then applies those parameters to the entire group (including the lower performers excluded from the “testing” group). *E.g.*, Cooper840, ¶ [0031]. Petitioner and Dr. Kiaei conflate that “testing” group with the broader “service group” and thus, incorrectly, argue that Cooper840 teaches a method “to determine the lowest SNR or MER for CMs in a service group and [] use that to select modulation parameters (such as modulation order) for the service group.” Petition at 28. That is not true.

Second, the Petition fails to explain how the Cooper-Cooper840 combination discloses the “composite” requirement of [1D]. Petitioner’s only attempt to explain this is a single conclusory paragraph that consists entirely of citations to Dr. Kiaei’s equally conclusory declaration and the ’438 Patent itself, but even so *still* falls short of explaining how that value meets the claim’s requirement. Petition at 30-31. Petitioner cannot meet its burden by ignoring the words of the claim.

Third, Petitioner and Dr. Kiaei are in error about Cooper’s disclosure relating to [1E]. Both assert that Cooper’s CMTS selects modulation profiles and other communication parameters for its logical channels, but Cooper contemplates only manual selection of modulation profiles by a human cable operator, not by the CMTS. And Cooper’s selection of other communication parameters is unconnected

to the group-assignment process of Cooper and nothing in Cooper or Petitioner's arguments can establish that any selection is "based on said composite SNR-related metric" as is required by element [1E].

1. Overview of the Asserted Prior Art

Petitioner provides brief overviews of Cooper and Cooper840, but neglects to include the fundamentals of each, which makes the prior art seem closer to the teachings of the '438 Patent than they actually are. These omissions undermine the Petition, especially as to its secondary reference Cooper840, because the prior art does not say what Petitioner says it does.

Rather than "determining a 'worst-case' SNR for each group of CMs assigned to a logical channel," as Petitioner says Cooper840 discloses (*e.g.*, Petition at 27, 28), Cooper840 in fact picks an SNR for a service group of CMs that is *never* the "worst-case" of the service group. The CMs that report the real "worst-case" statistics are instead excluded from the resulting selection of parameters but still have those communication parameters applied to them. In Cooper840, those "worst case" CMs are without hope of meeting the selected communication parameters. Cooper840 suggests fixing those CMs by other means, such as truck-rolls and on-site technician support.

For Cooper, Petitioner touts its "automated" processes (*e.g.*, Petition at 36) but Cooper's "automated" process is only for the grouping of modems into logical

channels, *not* the selection of modulation parameters for communicating over those logical channels. Cooper only ever discloses that a human manually does the latter selection process. And Petitioner cannot point to anything in Cooper that links the selection of other communication parameters it cites (differential encoding, pre-equalization parameters, and preamble lengths) with any composite SNR-related metric, as is required by the challenged claims.

The references and their proposed combination thus fail to disclose or render obvious multiple elements of the challenged claims. To put these failings into context, and to provide the Board that which Petitioner did not, a brief overview of the references follows.

a. Overview of Cooper (Ex. 1005)

Cooper utilizes the well-known concept of logical channels in a network. *See* Cooper, ¶ [0002]. Cooper’s logical channels are constructs used in upstream communications from modems to a CMTS, and multiple of these upstream logical channels can be abstracted onto the same physical channel. *Id.*, ¶ [0005]; *see also id.* (“DOCSIS 2.0 introduced this concept”); Ex. 1023 (DOCSIS 2.0) at 17 (defining “Logical (Upstream) Channel” as “A MAC entity identified by a unique channel ID and for which bandwidth is allocated by an associated MAP message. A physical upstream channel may support multiple logical upstream channels. The associated UCD and MAP messages completely describe the logical channel”).

Cooper bemoans the manual grouping and assignment process of logical channels in the prior art and touts “an automated process to determine logical channels using network elements (such as MTAs or cable modems) in conjunction with measurements made at the headend, via a CMTS device.” Cooper, ¶ [0007]. But not all of Cooper is an “automated process,” especially not what is depicted in Figure 6, upon which Petitioner heavily relies. Specifically, Cooper does not automate the selection of physical layer communication parameters (*e.g.*, modulation profiles), which requires human intervention at the outset before cable modems are assigned to logical channels. *See id.*, Abstract, ¶¶ [0021], [0036], [0037].

Figure 6 of Cooper illustrates “an exemplary panel display from a computer operation associated with the invention,” which “may be used by an operator to configure logical channels.” *Id.*, ¶¶ [0018], [0032]. The corresponding Figure 3 from the Cooper Provisional, as annotated by Petitioner, is reproduced below, and Figure 6 from Cooper (with element numbers and annotated by Patent Owner) is below that.

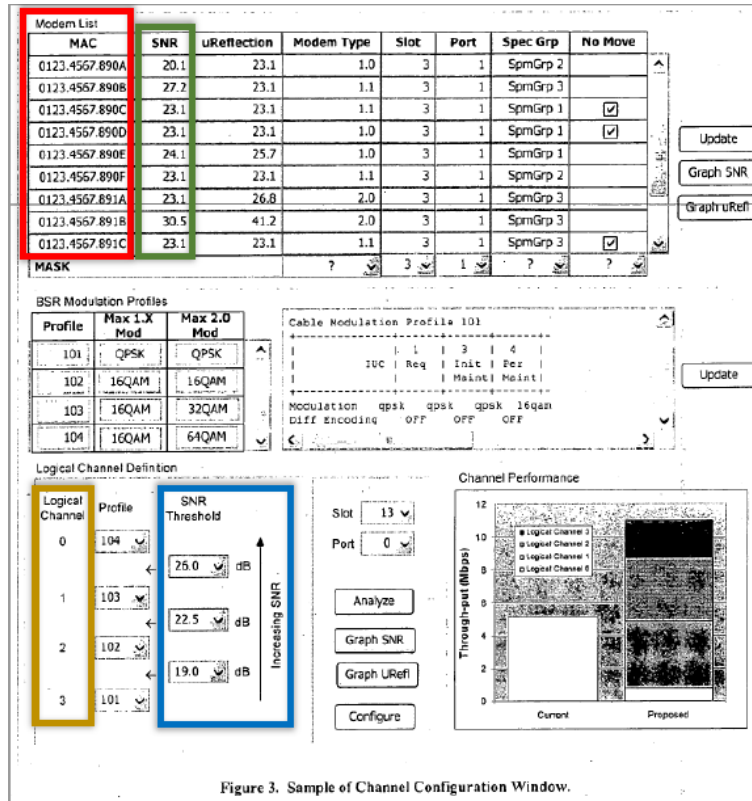


Figure 3. Sample of Channel Configuration Window.

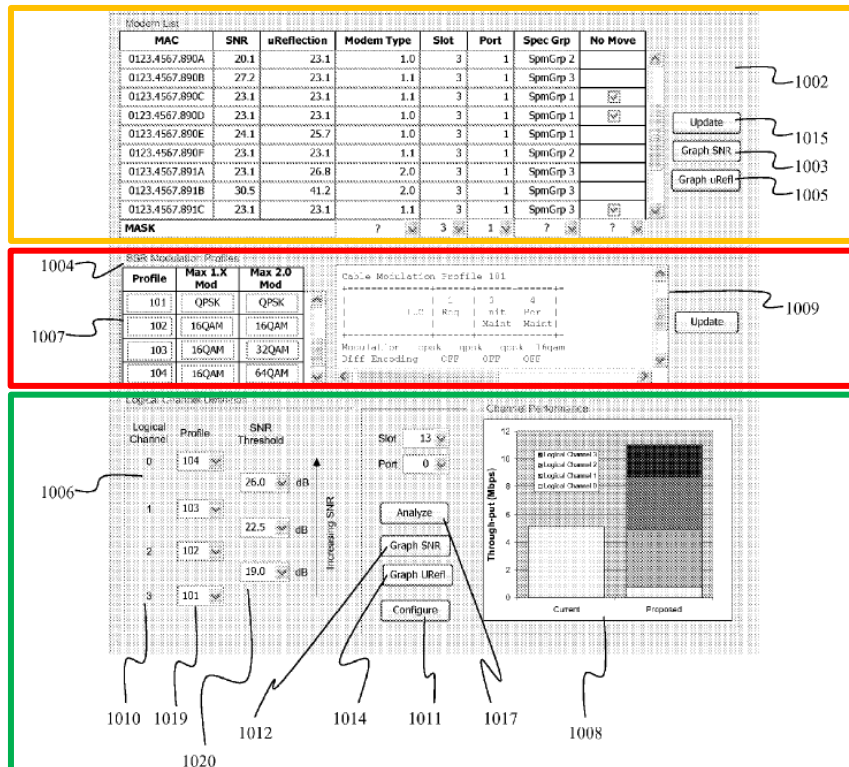


Fig. 6

Figure 6 from Cooper (second image above) depicts a “three-panel window” split into thirds, horizontally. The top third (orange box) depicts “a sorting of network element [sic] by various parameters 1002.” The middle third (red box) depicts the “profile/channel parameter definitions,” which includes the Modulation Profile display 1004. The bottom third (green box) is the “logical channel definition/performance display.” *Id.*, ¶ [0032].

While certain portions of the Logical Channel performance display 1002 and the Logical Channel Definition display panel 1006 are described as permitting automation (*id.*, ¶¶ [0033], [0039]-[0040]), this automation is only of the parameter thresholds, not communication parameter selection or Modulation Profile display panel 1004. Instead, it is up to the human operator “to configure various profile configuration templates which may later be assigned to an individual logical channel.” *Id.*, ¶ [0036]. There are no disclosures in Cooper of anything other than the human operator making any selection in the Modulation Profile display panel. There are also no disclosures in Cooper of anything other than the human operator making any selection of the modulation profiles 1019 in the Logical Channel performance display 1002—in fact, as depicted in Figure 6, those modulation profiles are manipulated by mouse clicks on a drop-down menu of potential modulation profiles per the gray down-facing arrow next to the profile numbers shown.

b. Overview of Cooper840 (Ex. 1030)

Cooper840 is titled “Method and Apparatus for Selecting a Network Element for Testing a Network.” It discloses processes for evaluating a service group of network elements, such as CMs, by creating a subset “testing pool” that is indicative of “the performance of ‘*most*’” (but not all) “of the network elements in the service group. *E.g.*, Cooper840, ¶ [0031] (emphasis added). Cooper840 creates the subset “testing pool” by identifying poor-performing network elements of the service group, excluding them from the testing pool, and then selecting one network element of that subset testing pool to serve as representative of the broader service group. *E.g., id.*, Abstract, ¶¶ [0001], [0010], [0028]. As Cooper840 states, “[t]he testing pool definitions allow an operator to determine configuration parameters which define how many (poor performing) network elements may be excluded from the MER network element pool used to control the network parameters.” *Id.*, ¶ [0031]. In other words, in Cooper840, the performance of the worst-performing CMs in a service group is ignored entirely when determining network parameters for that service group.

Cooper840’s subset testing pool “may be defined in several ways,” with Cooper840 providing two examples: a “percent of network elements which must support the modulation profile (e.g., 95% or 99%)” or a “number of network elements which may be excluded from the pool (e.g., 1 or 5)” (or as a percentage of

total, such as 20%). *Id.*, ¶¶ [0032]-[0033]. Cooper840 calls these “exclusionary conditions” and are used to create a testing pool that is not adversely (according to Cooper840) “driven by a very small set of rogue poor-performing network elements.” *Id.*, ¶ [0031]. Instead, Cooper840’s testing pool aims to “use measurements which indicate the performance of ‘most’ of the network elements”—but not all of them—“to control the network parameters.” *Id.*

Critically, the “poor performers” excluded from Cooper840’s “testing pool” are not excluded from the service group. Instead, those excluded “poor performers” will still be subject to the “network parameters” for the entire service group. *Id.* But Cooper840 suggests dealing with their underperformance through on-site, human intervention: “the operators may allow the remaining ‘poor performers’ to generate trouble tickets which would drive truck rolls and repairs and therefore allow the system to operate more efficiently.” *Id.*, ¶ [0031]. These are the same kinds of “truck rolls” that the inventions claimed by the ’438 Patent seek to eliminate entirely.

2. The Proposed Combination Fails to Render Obvious the “Generating” Step [1D]

Claim 1 of the ’438 Patent recites “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 plurality of SNR-related metrics corresponding to said one of said plurality of service groups.” ’438 Patent, cl. 1.

Petitioner admits that Cooper does not disclose the vast majority of this element, so Petitioner relies entirely on Cooper840. Petition at 27. Yet Cooper840 does not meet this element either.

The primary offense in Petitioner’s arguments is its mischaracterization of Cooper840. Petitioner contends that Cooper840 teaches a POSITA “to determine the lowest SNR or MER for CMs in a service group” (Petition at 28, 29), but Cooper840 discloses and teaches a different process altogether. Instead of using a “worst-case SNR profile,” Cooper840 ensures that it *never* uses the “worst-case.” Indeed, Cooper840 maligns systems where “the modulation configuration” is “driven by a very small set of rogue poor-performing network elements” (*i.e.*, the worst-case). Cooper840, ¶ [0031]. As set forth above, Cooper840 actively *excludes* the worst-case performers when determining network parameters to apply to the entire service group (including those worst-case performers). Cooper840 is thus *not* interested in optimizing for the entire service group or taking into account the “worst-case,” it cares only about “measurements which indicate the performance of ‘*most*’ of the network elements.” *Id.* (emphasis added).

The embodiment of Cooper840 cited by the Petition is that of Figure 5, which involves the evaluation of a service group by the selection of an individual CM in that service group. *Id.*, ¶ [0028]; *see also id.*, Abstract, title (“Method and Apparatus for Selecting a Network Element for Testing a Network”). The fundamental goal of

Cooper840 is to define a “testing network element pool” that is a subset of the service group. *Id.*, ¶ [0029]; *see also id.*, Abstract. Cooper840 does this by first determining a MER value (or other metric) associated with each CM in the service group. *Id.*, ¶¶ [0029]-[0030]. Cooper840 next sorts the CMs by those MER values (or other metrics). *Id.* Cooper840 then applies “testing pool definitions” to the “sorted network elements.” *Id.*, ¶ [0031]. As discussed in more detail in Section III.A.1.b, *supra*, these “testing pool definitions” necessarily exclude some number of CMs in the service group from the resulting “testing network element pool.” In the example in Cooper840, for instance, the lowest-performing 20% of the exemplary 10 network elements (i.e., network elements 0001 and 0002 of the service group) are “excluded from the MER decision network element pool.” *E.g.*, Cooper840, ¶ [0032], Table 1. Cooper840 then selects one of the remaining network elements that is in the “network element pool” for “an accurate MER measurement” for instantaneous or time-averaged testing. *Id.*, ¶¶ [0035]-[0037].

Because the “testing network element pool” is always a subset of the service group that excludes the worst performers, Petitioner and Dr. Kiaei conflate Cooper840’s “service group” with its “testing pool.” Cooper840’s reference to “***the lowest MER in the network element pool***” is not the same thing as the lowest MER ***in the service group***, as Petitioner argues. *Id.*, ¶ [0031]; Petition at 28 (“Cooper thus teaches a POSITA to determine the lowest SNR or MER for CMs in a service

group”). The low-performing network elements remain in the “service group;” they are simply excluded from the testing pool that determines the parameters to be applied across the service group. *Id.* Cooper840 simply does not teach setting a modulation profile as a function of the lowest SNR or MER in the service group. And nothing in the Petition or the accompanying Declaration of Dr. Kiaei (Ex. 1002) can bridge the gap between Cooper840’s setting of modulation profiles based on something that is necessarily always higher than the “worst-case” on the one hand with the “worst-case” requirement of [1D] on the other hand.

Petitioner’s discussion of how Cooper840 allegedly discloses a “composite SNR-related metric” (Petition at 30-31) reinforces the distinction between Cooper840 and Petitioner’s characterization of it. In that argument, Petitioner contends that the lowest MER value of Cooper840’s testing pool “is applied to all of the cable modems within a service group.” But that proves why Petitioner’s arguments fail: Petitioner’s own description means that some number of CMs that are part of the service group, but which have been excluded from the testing pool as having too low a MER value (such as network elements 0001 and 0002 in Table 1 of Cooper840), will not be able to transmit with the chosen modulation profile. Their MER values simply will not be sufficient for the modulation profile chosen for the service group. Cooper840 has a solution for those CMs, though, but it is far different from the solution of the ‘438 Patent. Cooper840 proposes that “operators may allow

the remaining ‘poor performers’ to generate trouble tickets which would drive truck rolls and repairs.” Cooper840, ¶ [0031]. Cooper840 calls this a way to make the system “operate more efficiently.” *Id.* Efficient or not, Cooper840 does not take into account a “worst-case,” which means Cooper-Cooper840 cannot meet element [1D] of the challenged claims and cannot render the challenged claims obvious.

3. The Proposed Combination Fails to Render Obvious the “Selecting” Step [1E]

Claim 1 of the ’438 Patent recites “selecting, by said CMTS, physical layer communication parameters to be used for communicating with said one of said plurality of service groups based on said composite SNR-related metric.” ’438 Patent, cl. 1. Petitioner addresses this element primarily by referring back to its prior mischaracterizations of Cooper840 and prior failures in element [1D] discussed above. *E.g.*, Petition at 34-37. The failings in [1D] thus apply equally here, by Petitioner’s own urging. In particular, because Cooper840 cannot fill the “generating ... a composite SNR-related metric based at least in part on a worst-case SNR profile” gap in Cooper for element [1D], Cooper840 cannot meet the “based

on *said* composite SNR-related metric” of element [1E] either.³ But the Petition is deficient in other additional ways on this claim element too.

Petitioner argues (by reference to [1D]) that the alleged “composite SNR-related metric” is used by the proposed combination of Cooper and Cooper840 to “determine[] the lowest SNR or MER of a CM in a service group,” and the combination then “uses that information to select the modulation parameters used to communicate with the service group.” Petition at 32. Petitioner likewise argues that the “various different modulation profile parameters may be selected and used for communicating with the CMs assigned to each logical channel.” *Id.* 34; *see also id.*, 25 (“Cooper also determines multiple physical layer communication parameters for each service group.”). Finally, Petitioner hedges its argument by referring to the “Diff Encoding” indicator in Figure 6 of Cooper and other generic and irrelevant disclosures of communication parameters of CMs (pre-equalization parameters and preamble lengths) as allegedly bearing on this element. *See* Petition at 33-35. But element [1E] requires “selecting, *by said CMTS*, physical layer communication

³ Therefore, it is not true, as Petitioner argues, that “[i]n the Cooper-Cooper840 system, these [physical layer communication] parameters are selected for each group based on the lowest SNR or MER of any CM within that group.” Petition at 35.

parameters” and that such parameters be “*based on said composite SNR-related metric.*” None of Petitioner’s variously cited parameters of Cooper meet these requirements of the challenged claims.

As discussed in the parallel Brief in Support of Discretionary Denial (Paper 8) in this matter, this is Petitioner’s third (and fourth and fifth) bite at the apple on similar claimed subject matter using the same primary references, including Cooper. Whereas in the first two petitions on U.S. Patent No. 10,135,682 Petitioner did not explain its reasoning in [1E] with much detail in a single page of argument, Petitioner has gained a strategic advantage of seeing Patent Owner’s rebuttal on [1E] and has used that strategic advantage to throw every possible argument against the wall this time. Indeed, Petitioner has quintupled the length of its argument on element [1E] and expanded its argument to rely not just on modulation profiles but now to now also rely on pre-equalization parameters, preamble lengths, and differential encoding. For example, Petitioner now directly argues that Cooper’s “CMTS executes an algorithm to automatically select configuration parameters” which includes “modulation order” and argues that “Cooper discloses that the process [described by Petitioner] of selecting physical layer configuration parameters may be performed by the CMTS’s microprocessor.” Petition at 25, 36. Unfortunately for Petitioner, that is not true, and Petitioner’s “everything but the kitchen sink”

approach this time around still fails to meet its burden on element [1E] because Cooper does not disclose what is required by the challenged claims.

As the Board may notice on close inspection, while Petitioner argues that Cooper discloses an automated or CMTS-initiated selection of physical layer communication parameters, all of Petitioner's citations talk about a different type of automated selection process in Cooper, which is *assigning* of CMs to logical groups (at most as may be related to elements [1B] and [1C]), not *selecting* physical layer communication parameters for those groups (as required by element [1E]). Petitioner refers to this process as an "automated process" or an "optimization process" but in each case admits (as it must) that the process is for "select[ing] the optimal grouping of modems to be assigned to each of the multiple logical channels" or to "determine the optimal value for thresholds to isolate the various logical channels," meaning the boundaries that separate them for the assignment process. Petition at 36. This is true for each of Petitioner's four argued communication parameters. Thus, none of Petitioner's cited portions of Cooper can meet the requirements of element [1E].

a. Cooper's Modulation Profiles Are Selected by a Human Operator, Not the CMTS

Cooper contemplates only manual selection of modulation profiles by a human cable operator, not by the CMTS. Cooper, ¶ [0036], Fig. 6. There are only

four passages that discuss “modulation profiles” in Cooper, and each of them describes those “modulation profiles” not as parameters selected by the CMTS but as parameters selected by a human operator interacting with a graphical display. *Id.*, Abstract (“An interactive display is ***provided to an operator*** which enables analysis of ... modulation profiles” (emphasis added)); *id.*, ¶ [0021] (“***[T]he operator*** can differentiate cable modems ... And then set up multiple logical channels, each one with a different modulation rate” (emphasis added)). Even in Cooper’s most detailed disclosure about modulation profiles and their selection, Cooper provides no teaching or suggestion that anything about the modulation selection can be done by the CMTS, only that it is done manually by a human:

The Modulation Profile display panel 1004 provides ***the ability for the operator*** to configure various profile configuration templates which may later be assigned to an individual logical channel. That is, ***the operator may view, create and edit modulation profiles 1007*** which optimize the specific needs of a subset of the network elements. Additional details of a modulation profile may be displayed as well in an expanded detail window 1009.

Cooper, ¶ [0036] (emphasis added). The same is true in the discussion of the selection of modulation profiles in the Logical Channel Definition display panel at the bottom of Figure 6: it “provides the ability to ... select the modulation profiles 1019 ***viewed in the channel profile/parameter definition panel*** and associated with

various performance parameters and thresholds 1020.” *Id.*, ¶ [0037] (emphasis added). This latter point is reinforced by Figure 6 itself, which depicts the familiar clickable drop-down lists of modulation profiles for selection by a user in a graphical user interface (at the bottom of the figure).

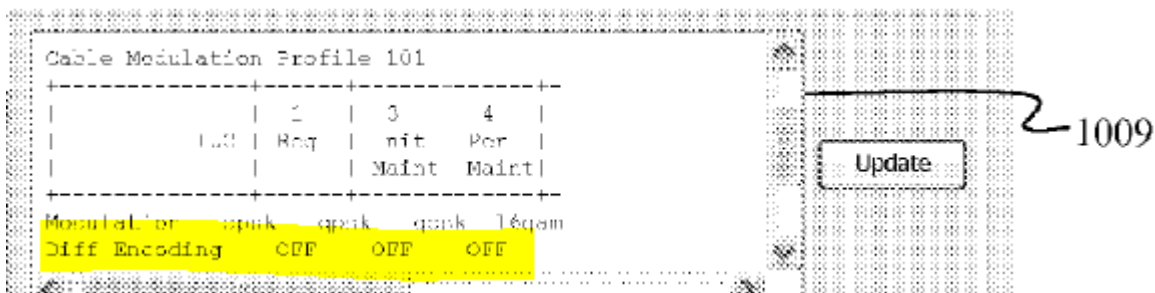
b. Cooper’s Pre-Equalization Parameters and Preamble Lengths Are Generic to All Communications and, in Any Event, Are Not “Based on Said Composite SNR-Related Metric”

Petitioner’s new reliance on pre-equalization parameters and preamble lengths cites to half a dozen paragraphs of Cooper and four of its figures (Petition at 35), but these numerous citations hide that the concepts or “pre-equalization parameters” and “preamble lengths” occur only in Paragraph [0025] of Cooper, which is a generic discussion of communication between a CMTS and a CM as exists in all CMTS-based systems. *See, e.g.*, Ex. 1022 (DOCSIS 1.1) at 27-28 (discussing pre-equalization and associated parameters as required for all CM-to-CMTS communications); Ex. 1023 (DOCSIS 2.0) at 73-75 (same); *see also* Ex. 1022 (DOCSIS 1.1) at 329-330 (discussing preambles and the lengths they may take); Ex. 1023 (DOCSIS 2.0) at 450-51 (same). The fact that there are pre-equalization parameters and preamble lengths in those communications is to be expected in a CMTS-based communication system (per the DOCSIS citations a few lines above) and, in any event, nothing in Cooper connects those parameters to the process of

assigning CMs to logical channels as Petitioner contends meets the other elements of the challenged claims. Thus, even if pre-equalization parameters or preamble lengths are selected by the CMTS, nothing in Cooper discloses that either Cooper's pre-equalization parameters or preamble lengths is "based on said composite SNR-related metric" as is also required by element [1E].

c. Cooper's Differential Encoding Has No Explanatory Disclosure and, in Any Event, Is Not "Based on Said Composite SNR-Related Metric"

Even worse than Petitioner's new reliance on pre-equalization parameters and preamble lengths above, which at least find some explanation in a single (albeit unrelated) paragraph of Cooper, Petitioner's reliance on differential encoding is based on a single, grainy portion of Cooper's Figure 6 without any supporting disclosure in Cooper whatsoever. The sum total of Cooper's disclosure on "differential encoding" is below (highlighted in yellow):



Cooper, Fig. 6. Thus, Cooper is without any disclosure of how differential encoding is selected (if it is even selected at all), except that it is included in a portion of a user interface related to modulation profiles that is definitively controlled by a human

operator, not by the CMTS, as discussed in Section III.A.3.a above. The presence of differential encoding with modulation profiles in that user interface portion at least suggests that differential encoding is selected by a user as well. Petitioner certainly does not have any basis in Cooper to argue otherwise.

Regardless, even assuming, *arguendo*, that differential encoding is selected by the CMTS, nothing in Cooper discloses what (if anything) the selection of differential encoding is based on. Cooper certainly does not disclose, and Petitioner certainly has no basis in Cooper to argue, that there is a selection of differential encoding “based on said composite SNR-related metric” as is required by element [1E].

d. Petitioner Confuses Cooper’s Disclosure of the CMTS’s Assignment of CMs to Logical Channels with the Challenged Claims’ Requirement of “Selecting ... Physical Layer Communication Parameters”

The final problem with Petitioner’s arguments on element [1E] is that Petitioner cites Cooper’s automated **grouping** of CMs in logical channels as a basis to say Cooper has automated **selection** of physical layer communication parameters for those channels (*e.g.*, Petition at 36), but that conflates two different processes of Cooper. While Cooper discloses certain automated groupings of logical channels, this automation is confined to automating the parameter thresholds that define those groups. *See* Cooper, ¶¶ [0039], [0040]. This automation is decidedly not of the

selection of the physical layer *communication parameters* for those groups, which Cooper instead discloses must be manually pre-selected by the human user. *See id.*; *see also id.*, Figure 6, Abstract, ¶¶ [0036], [0037]. Cooper’s CMTS can pick which parameter to use to group the CMs, but the physical layer communication parameters that are pre-selected and associated with each logical channel are already preset manually by a human operator and any changes to those parameters must be done by hand—not by the CMTS. Put succinctly, Cooper’s CMTS fiddles only with logical channel parameter *thresholds* (*i.e.*, how to define the scope of the channel or which modems are in it), not CM *communication parameters*. There simply is no automatic configuration or “selection” of the physical layer communication parameters, whether by the CMTS or otherwise.

Petitioner tries to use vague language to confuse the logical channel assignment process with the human-based physical parameter selection of Cooper, but Petitioner’s own citations betray it. Cooper’s Paragraph [0030] (cited by Petition at 36) is a discussion of Steps S50, S52, and S54 of its Figure 5, which are “Determine Logical Channel Definitions,” “Analyzed Measured NE [Network Element] Parameters,” and “Compare With Threshold Values,” respectively. Cooper, ¶ [0030], Fig. 5. This all has to do with the assignment of CMs to logical groups, such as occurs in the next step of the process, S56, described in the next paragraph of Cooper, Paragraph [0031]. Cooper’s Paragraphs [0040] and [0043]

(cited by Petition at 36) confirm that the algorithmic “automatic” process of Cooper is limited to the assignment of CMs to logical channels, the “logical channel configuration process,” as Cooper calls it. Finally, Cooper’s Paragraph [0042] (cited by Petition at 36) is a boilerplate disclosure that the processes in Figures 5 and 6 may be implemented by a computer. But this does not buy Petitioner anything. As described above, this is nothing more than confirming Cooper’s (insufficient) disclosure that a human operator can use a computer interface (such as in Figure 6) to select a physical layer communication parameter for a logical group. Nowhere, however, is there any disclosure of that selection process being done *by the CMTS*.

For Dr. Kiaei’s part, all he provides is a conclusory regurgitation of the Petition that has very minor changes in the wording that do nothing to hide the copy-and-paste job that is his Declaration. *Compare* Petition at 36-37 with Ex. 1002, ¶¶ 118-119. Dr. Kiaei’s opinions thus fall victim to the same issues as the Petition: Dr. Kiaei focuses on the wrong process (the logical channel assignment process) and ends with a conclusion entirely unconnected to that process. The following is all that Dr. Kiaei can provide the Board to support his opinions, hiding behind a cross-cite to element [1D]: “Cooper-Cooper840 therefore teaches a CMTS selecting/determining network communication parameters (*e.g.*, modulation order, whether to use differential encoding, preamble length, and pre-equalization parameters) for a group of cable modems as part of its logical channel configuration.

See Section X.A.1.d. [discussion of element [1D]], *supra.*” Ex. 1002, ¶ 119. This is insufficient, *ipse dixit* expert testimony that should be given little to no weight.

Petitioner and its expert fail to bridge the gap between the disclosed automated assignment process and the claimed selection process. Accordingly, Petitioner has not met its burden to show that the proposed combination discloses “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” of element [1E].

4. A POSITA Would Not Be Motivated to Combine Cooper and Cooper840 as Proposed in the Petition

Further to Petitioner’s failure to meet elements [1D] and [1E] of the challenged claims, Petitioner’s proposed combination and argued motivation to combine fail as being based on a faulty read of Cooper840. Petitioner explains that a POSITA would be motivated to so combine the references “because it ensures that all of the CM’s can pass data on the channel” and “would also help to implement Cooper’s dynamic SNR thresholds for assigning CMs to a logical channel.” Petition at 28-29. But, as shown above, Cooper840 does *not* ensure that all of the CMs can pass data (those most likely to be unable to are intentionally ignored), nor does it teach generation of a composite based on the worst case of a group or teach a CMTS selecting an optimal physical layer communication parameter (based on a composite

SNR-related metric). *See* Sections III.A.1.b, III.A.2, and III.A.3, *supra*. Petitioner’s motivation to combine thus fails for the same reason its arguments on elements [1D] and [1E] fail.

5. The Proposed Combination Fails to Render Obvious the Other Challenged Claims Because It Fails to Render Obvious Claim 1

As described above, Petitioner has failed to carry its burden to show that claim 1 is obvious in view of the combination of Cooper and Cooper840. Petitioner’s analysis of claim 10 relies on its analysis for claim 1, at least for the elements on which it has failed to meet its burden. Petition at 40-41. Therefore, Petitioner fails to render obvious claim 10 for at least the same reasons as for claim 1. By failing to render obvious either independent claim, it follows that Petitioner has also failed to render obvious the dependent claims.

B. Ground B: The Proposed Combination of Cooper-Azenkot Fails to Render Obvious the Challenged Claims

Ground B suffers many of the same failings as Ground A because the Petition largely parallels its arguments in Ground A to support Ground B. In essence, Petitioner swaps out Cooper840 for Azenkot, apparently because both contain the phrase “worst-case” or “lowest common denominator.” As with Cooper840, however, Petitioner misrepresents or misunderstands Azenkot’s disclosures, which do not meet the requirements of element [1D] of the challenged claims as Petitioner

contends. For similar reasons as for Ground A, plus the additional reasons detailed below, Petitioner has not met its burden on Ground B.

1. Overview of Azenkot (Ex. 1031)

Azenkot was cited against the '438 Patent during prosecution. *E.g.*, '438 Patent, p. 2.

Azenkot describes a method by which CMs are segregated onto different logical channels with different burst profiles. Azenkot, ¶ [0002]. Azenkot's written description begins by criticizing the prior-art approach of setting burst profiles "to the lowest common denominator such that the least capable cable modem (CM) on the system can comply with it." *Id.*, ¶ [0001]. Azenkot's criticism is based on this approach "penaliz[ing] all CMs on the system to transmit at a lower throughput than they are capable of," which "results in a lower average throughput on the channel." *Id.* "In other words," Azenkot continues, in the prior art, "in order to ensure that the worst CM has a robust burst profile with adequate error correction protection, the whole channel is forced to operate at a lower throughput." *Id.* Azenkot's solution is "segregating the CMs in the system into groups based upon throughput capability," such as "segregating CMs with high throughput capability" from "lesser CMs." *Id.*, ¶ [0002].

Azenkot describes a variety of embodiments to accomplish its segregation of CMs, but each evaluates the CMs individually and moves each CM, one by one, to

different logical channels with pre-set and different burst profiles that are appropriate for that one CM. *See id.*, ¶¶ [0002], [0005], [0009]-[0013]. Azenkot creates “[a]s many different burst profile upstreams as necessary” so that it can move each CM to an appropriate upstream. *Id.*, ¶ [0013]. Azenkot does not determine any “composite” metric of the groups it has created to select “communication parameters,” because it does not need to. The burst profiles for Azenkot’s groups have been set in advance without regard to which CMs are assigned to the group.

Some of Azenkot’s embodiments contemplate “post-registration monitoring” of DOCSIS 2.0 modems whereby “the CMTS [may] conclude that certain CMs need to have their burst profiles changed to handle changing conditions.” *Id.*, ¶ [0013]. When that happens, however, the logical channel group is not modified. Instead, the CMs experiencing “changing conditions” are moved to a different, more appropriate logical channel. *Id.* If an appropriate channel does not exist, Azenkot creates one before moving the CM to it; as discussed above, “[a]s many different burst profile upstreams as necessary are created” in Azenkot. *Id.*, ¶ [0013]. In either case, low performers do not alter the communication parameters or burst profile of the logical channel they are in because a low-performer in a logical channel group is moved to a different logical channel group so as not to affect the performance of the others in its original group. *Id.*, ¶ [0012].

2. The Proposed Combination Fails to Render Obvious the “Generating” Step [1D]

Petitioner’s argument on element [1D] for the Cooper-Azenkot combination parallels that of the Cooper-Cooper840 combination. But Azenkot is even further from element [1D] of the challenged claims because Azenkot is fundamentally concerned with moving individual CMs among pre-set groups, not generating a metric corresponding to a group or selecting communication parameters for that group. Azenkot’s measurements are used to move individual CMs to different, pre-set logical channels. There is no disclosure of Azenkot generating a “worst-case SNR profile,” let alone any characteristics that could reasonably be considered a “composite SNR-related metric” that is “corresponding to said one of said plurality of service groups” as is required by element [1D]. Petitioner’s arguments to the contrary are not supported by Azenkot and are instead based on a misrepresentation of Azenkot’s disclosures.

Petitioner quotes Azenkot as disclosing that its burst profiles are “based on the ‘least capable modem’ in the group” (Petition at 45-46), but this portion of Azenkot is a criticism of the prior-art approach and is *not* Azenkot’s proposed solution, as Petitioner otherwise relies on:

Prior art cable modem termination systems (CMTS) in DOCSIS systems establish upstream burst profiles, one for each DOCSIS upstream. The burst profile for each upstream controls the data

throughput rate and other burst parameters that all cable modems transmitting on that upstream must use. *The burst profile must be set to the lowest common denominator such that the least capable cable modem (CM) on the system can comply with it...* This results in a lower average throughput on the channel.... Therefore, what is needed is a way to get higher average throughput by using different upstream logical channels, each with its own burst profile.

Azenkot, ¶¶ [0001]-[0002] (emphasis added). Petitioner later cites to Azenkot's Paragraph [0089], but that too is a discussion criticizing a prior art technique as “penaliz[ing] all modems for just a few who have high attenuation paths.” *See id.*, ¶ [0092] (describing Azenkot's invention as distinguished over this prior art technique). Contrary to Petitioner's misleading assertion, there is no disclosure in Azenkot that Azenkot's proposed *logical channels* use burst profiles that are set to the “least capable cable modem” for a group.

Relatedly, and also contrary to Petitioner's mischaracterization, burst profiles are not “selected” or “set[.]” in Azenkot after assignment of CMs. Petition at 45-46. Petitioner cites to Paragraphs [0016], [0040]-[0041], and [0092]-[0094] for support (*id.*), but those paragraphs relate only to the assignment of CMs to logical channels already having certain characteristics. Petitioner also cites to Paragraphs [0001], [0007], [0013], and [0089] of Azenkot, but those paragraphs contradict Petitioner's read of Azenkot. Paragraph [0013] describes the process of the creation of a new

logical channel and assignment of CMs to it wherein the burst profile is chosen before any CMs have been assigned:

Subsequent monitoring may cause the CMTS to conclude that certain CMs need to have their burst profiles changed to handle changing conditions such as falling SNR, burst noise, impulse noise etc. ***The CMTS will then create a new physical upstream channel or a new upstream logical channel (hereafter new upstream channel) with an appropriate burst profile and send downstream message(s) to a CM to be changed to the new upstream channel telling it which new burst profile to assume and ordering it to change to the new upstream channel.***

Azenkot, ¶ [0013] (emphasis added); *see also id.* (“If an upstream channel does not already exist having the needed burst profile and linked to the appropriate downstream to which a CM is listening, then an upstream with the appropriate burst profile will be created. As many different burst profile upstreams as necessary are created.”); *id.* at ¶ [0007] (“The invention creates multiple logical groups based upon type/modulation profile or throughput ability or both, and creates an upstream for each logical group, each upstream having a burst profile tailored to the modem types/burst profile in the logical group and/or the throughput ability of the modems in the group.”). Finally, Paragraphs [0001] and [0089] describe the prior art, not Azenkot’s invention, as discussed above.

Nowhere is there any disclosure in Azenkot of generating a metric corresponding to the logical channel, let alone a metric based on a CM assigned to a logical channel. Indeed, that would be contrary to Azenkot's principle of moving CMs among logical channels so as to be assigned to the most appropriate logical channel at any given time. *E.g.*, Azenkot, ¶¶ [0002], [0005].

But even assuming, *arguendo*, that an Azenkot logical channel did accommodate the least capable CM assigned to it (it does not—any low-performing CM is instead ***moved*** to a different and more-appropriate group), Petitioner still cannot show any “generating” of “a composite SNR-related metric based at least in part on a worst-case SNR profile” as required by element [1D]. Petitioner argues that Azenkot “maintain[s] groupings so that the worst SNR in any group is still high enough to accommodate the burst profile being applied to that group” in an attempt to get around this issue. Petition at 46. But that is no more than a coincidence of Azenkot's methods and still does not get Petitioner to element [1D]. Azenkot's groups tolerate low performers so long as they are not ***too*** low performing, and once they are, they are moved from the group rather than any selection of a metric or generation of a parameter corresponding to the group being done.

Petitioner also fails to demonstrate which part of Azenkot's disclosure satisfies the “composite” requirement of element [1D]. Petitioner only makes two conclusory assertions in this regard.

First, Petitioner argues that “[a] POSITA would also have understood that Azenkot’s disclosure of setting a burst profile based on the least capable CM is also a disclosure of generating a value for lowest SNR for a group of CMs (which is required to set the burst profile).” Petition at 46. But Petitioner makes this leap only by citation to its expert’s declaration. *Id.* (citing Ex. 1002, ¶ 141). And Dr. Kiaei’s declaration is just as conclusory as the Petition—indeed it is nearly word-for-word identical to the Petition and similarly lacks any supporting citations for this proposition to the prior art at issue. *See* Ex. 1002, ¶ 141; *compare id. with* Petition at 46.

Second, Petitioner argues that the Cooper-Azenkot combination discloses this claim element “because it is applied to all of the cable modems within a service group.” Petition at 49. Again, Petitioner cites only to Dr. Kiaei, and again, Dr. Kiaei has nothing else to add or provide in support from the reference beyond the exact same insufficient words written in the Petition. Conclusory, copy-and-paste, *ipse dixit* testimony divorced from the disclosures of the prior art references themselves cannot satisfy Petitioner’s burden for institution. Even still, Petitioner and Dr. Kiaei are wrong. As discussed above, Azenkot’s goal is to keep logical channels operating as defined in advance by moving cable modems to different logical channels when their performance goes outside the pre-defined characteristics of those logical channels rather than generating a composite metric based on the CMs in the group.

Azenkot, ¶¶ [0002], [0005]. Azenkot’s measurement of SNR of a cable modem (*id.*, ¶ [0144]) does not lead to generation of any kind of composite metric corresponding to Azenkot’s logical channels because it is used simply to move that CM to an appropriate, pre-defined logical channel. *Id.*, ¶ [0012]. Despite what Petitioner and Dr. Kiaei say, this does not meet the requirements of element [1D] of the ’438 Patent.

Accordingly, Petitioner has not met its burden to show that the proposed combination discloses “a composite SNR-related metric based at least in part on a worst-case SNR profile of said plurality of SNR-related metrics corresponding to said one of said plurality of service groups.”

3. The Proposed Combination Fails to Render Obvious the “Selecting” Step [1E]

Petitioner argues its Cooper-Azenkot combination for [1E] no differently than it argues its Cooper-Cooper840 combination for [1E], complete with less than a page of conclusory language which relies entirely on the prior failures in its argument of [1D]. Thus, the failings in [1D] for Cooper-Azenkot apply equally here, by Petitioner’s own urging. So do Petitioner’s failings in [1E] for Cooper-Cooper840 discussed above, particularly with regard to the differences between Cooper and the language of the challenged claims. To recap, Cooper contemplates only manual selection of modulation profiles by a human cable operator, not by the CMTS. Cooper, ¶ [0036], Fig. 6. And Cooper’s disclosures of pre-equalization parameters,

preamble lengths, and differential encoding, to the extent they are selected at all, they are not selected based on “said composite SNR-related metric” because they are unrelated to the logical channel assignment and optimization process disclosed by Cooper. The only automation disclosed in Cooper is decidedly not of the physical layer communication parameters, which instead must be manually selected by the human user. *See id.*; *see also id.*, Figure 6, Abstract, ¶¶ [0036], [0037]. Nothing about Azenkot changes the fact that Cooper’s CMTS fails to meet [1E].

4. A POSITA Would Not Be Motivated to Combine Cooper and Azenkot as Proposed in the Petition

Like the Cooper-Cooper840 combination, a POSITA would not have been motivated to combine Cooper and Azenkot because the Cooper-Azenkot combination fails for the same reason that the Cooper-Cooper840 combination fails: it is based on a false premise about what each reference actually discloses. There is no generation of a composite metric based on a worst case disclosed in Azenkot, just as there is no selection based on the same composite in the Cooper-Azenkot combination. Petitioner’s motivation to combine thus fails for the same reason its arguments on elements [1D] and [1E] fail.

5. The Proposed Combination Fails to Render Obvious the Other Challenged Claims Because It Fails to Render Obvious Claim 1

As described above, Petitioner has failed to carry its burden to show that claim 1 is obvious in view of the combination of Cooper and Azenkot. Petitioner treats

the analysis of claims 1 and 10 as the same. Petition at 43-51. Therefore, Petitioner fails to render obvious claim 10 for at least the same reasons as for claim 1. By failing to render obvious either independent claim, it follows that Petitioner has also failed to render obvious the dependent claims.

C. Grounds C-L: The Proposed Combinations in These Backup Grounds All Rely on Cooper-Cooper840 or Cooper-Azenkot, which Fail to Render Obvious the Challenged Claims

Grounds C-L are essentially backup Grounds, all of which incorporate the same proposed combinations and references of Grounds A and B, shown to be insufficient above and in more detail above. These backup Grounds fail for the same reasons.

1. Grounds C-F Do Not Remedy the Failures in Grounds A and B

Each of the remaining grounds C-F rely either directly or indirectly on the prior combinations of Cooper-Cooper840 or Cooper-Azenkot for independent claims 1 and 10 and thus fail for the same reasons. Grounds C-D purport to address claims 1-8 and 10-17 by introducing a new reference, Monk; but Monk is primarily used for dependent claims 3, 4, 5, 6, 12, 13, 14, and 15. Monk is additionally relied upon and combined with Cooper-Cooper840 and Cooper-Azenkot to teach an “SNR-related metric of a CM over a range of frequencies” but does not otherwise add to Petitioner’s arguments as to Claim 1 and 10. Petition at 64. Petitioner does not argue that Monk discloses generation of a composite or use of a worst case. *See*

Petition at 64-66. Grounds E-F address only dependent claims 9 and 18 and thus fail for the same reasons as Petitioner’s arguments on the independent claims.

2. Grounds G-L Adding Currivan Have All the Same Problems as Grounds A and B

Petitioner apparently lacks confidence in its arguments on elements [1E] and [10E] in Grounds A and B because it proposes Grounds G-L to purportedly render obvious all claims by introducing a third reference, Currivan, to address an assertion that Cooper-Cooper⁸⁴⁰ and Cooper-Azenkot “do not teach selecting *multiple* ‘physical layer communication parameters’ as recited in [1E] and [10E].” Petition at 71 (emphasis added). Because Petitioner proposes to add Currivan solely to address an apparent issue regarding multiplicity of parameters, Currivan cannot solve the problems with the Petition identified above. For one, Grounds A and B have issues in elements [1D] and [10D] too (*see* Sections III.A.2 and III.B.2, *supra*), and Petitioner does not propose that Currivan fill those gaps. For another, Grounds A and B have issues in elements [1E] and [10E] separate and apart from the number of parameters selected—Cooper’s CMTS does not select modulation profiles (that is done solely by a human operator) and to the extent any physical layer communication parameters are selected, they are not selected “based on said composite SNR-related metric.” *See* Section III.A.3, *supra*. It is irrelevant how many parameters are selected when none are selected “by said CMTS” and “based

on said composite SNR-related metric” as required by [1E] and [10E]. Therefore, for the same reasons Grounds A and B fail in relation to elements [1D], [1E], [10D], and [10E], Grounds G-L fail too.

To the extent Petitioner attempts to stretch its reliance on Currivan to fix the “selecting, by said CMTS” issue with Grounds A and B apart from the number of parameters selected, Grounds G-L would still fail because Petitioner’s characterization of Currivan—much like its characterizations of Cooper⁸⁴⁰ and Azenkot—is flawed.

a. Overview of Currivan (Ex. 1028)

Currivan was cited against the ’438 Patent during prosecution. *E.g.*, ’438 Patent, p. 2.

Currivan is a reference that is centrally interested in permitting transmitters (like CMs) to “overcome a server attenuation in its transmission path to [a] receiver” (like a CMTS) “and thereby maintain reliable operation at the receiver.” Currivan, ¶ [0023]. Currivan accomplishes this by segregating a plurality of CMs being served by a CMTS “into at least two CM groups comprising a first group of CMs with which standard registering and ranging operations are performed and a second group of CMs with which attenuated transmission registering and ranging operations are performed.” *Id.*, ¶ [0026]. The CMs are assigned to each group depending on their characteristics (whether “professionally installed” or “subscriber installed”) or their

“ranging results, e.g., ranging success or the lack thereof, or received ranging burst parameters such as SNR.” *Id.*, ¶ [0034].

Currivan focuses on how to assist the second group of CMs that are subject to attenuation by two main approaches. The first approach is for the transmitter to “increase [its] SNR at the receiver without increasing its transmitted signal power” beyond a predetermined limit. *Id.*, ¶ [0024]. The second approach is for a transmitter to “reduce its own throughput while retaining its assigned modulation parameters, and hence not require the other transmitters on the communication channel to reduce their throughput as well.” *Id.*, ¶ [0025]. Despite Petitioner’s arguments otherwise, Currivan does **not** disclose its CMTS selecting modulation order for groups of CMs. *E.g.*, Petition at 72.

b. Currivan Cannot Cure the Problems with Cooper-Cooper⁸⁴⁰ and Cooper-Azenkot for Elements [1E] and [10E]

Currivan is a much different reference than Petitioner characterizes it to be. Petitioner argues that Currivan “selects a modulation order ... for each group” of CMs (Petition at 72) and that “[t]he burst profiles are selected by the CMTS and assigned to CMs (*id.* at 75), but neither is true, and Petitioner’s citations do not support Petitioner’s read. *Id.* at 72 (citing Currivan, ¶¶ [0034], [0079], [0157], [0182]); *id.* at 75 (citing Currivan, ¶¶ [0034], [0079], [0176], [0182], [0192]). Paragraphs [0034] and [0192] describe the grouping of CMs, not an assignment of

modulation order. So does Paragraph [0079], but it also discusses the CMTS's direction to an *individual* CM ("*the* CM") to adapt its upstream transmissions so as not to disadvantage other CMs with which it is grouped, as discussed above. Paragraph [0157] discusses a "robust mode" of operation for an individual low-performing CM so as to permit it to successfully complete ranging at a "lower order modulation" even if it can support higher-order modulations, as it might later. *See* Currivan, ¶¶ [0153]-[0157]. There is nothing about group-level selection of physical layer communication parameters disclosed. Finally, Paragraphs [0176] and [0182] further disprove Petitioner's read of Currivan. There, Currivan discloses a CM that successfully completes ranging in the "robust logical channel" (the one for low performers) and is reassigned by the CMTS "to the normal logical channel" where it can begin to communicate on the higher modulation order already assigned to that channel, but with modifications so that its individual throughput is lowered. The result is that the low-performer can exist in the normal logical channel "but the overall throughput and throughput efficiency of the channel is unchanged" by the addition of that low-performer. *Id.*, ¶ [0182]; *see also id.*, ¶ [0176]. Again, there is nothing about selection of group-level physical layer communication parameters in that paragraph, only the reassignment of one CM to a different group and the adjustment of that particular CM to be able to participate in that group.

It makes sense that Petitioner's citations do not line up to elements [1E] and [10E] because Currivan criticizes the changing modulation profiles for CMs in three different ways. First, Currivan criticizes "Adaptive Modulation" approaches in the prior art as "typically immense[ly] complex[.]" Currivan, ¶ [0016]. Second, Currivan criticizes the approach of a poor-performing CM dragging down the performance of an entire group of CMs:

[I]f one of the transmitters is disadvantages and unable to communicate using the particular modulation order at hand, such as 64 QAM, then this would cause a reduction of the modulation order on the entire channel to a lower order prescribed modulation that all of the transmitters can accommodate.

Currivan, ¶ [0018]. Third, Currivan even criticizes the changing of a modulation profile for a single poor-performing CM because "by doing so, it also reduces the throughput efficiency bits per second per Hertz (Hz)) of the overall communications channel." *Id.*, ¶¶ [0065]-[0066].

Rather than select a modulation profile for a group of CMs, what Currivan seeks to do is to change the operating parameters of an individual, poor-performing CM so it can continue operating in the group, at the group's pre-defined modulation profile. *Id.*, ¶¶ [0068]-[0069]. Said differently, Currivan does not seek to select any communication parameters for the CM group as a whole based on the members of that group, it seeks to change parameters of an individual CM in the group by

decreasing the performance of that individual CM so that the group as a whole does not suffer.

Petitioner also argues that Currivan discloses “increasing the transmit power per code word while reducing the number of codes transmitted to increase the SNR to support a higher modulation order” (Petition at 73); and “selecting the additional physical layer communication parameters of strength of forward error correction and length of preambles” (Petition at 75). Petitioner, however, fails to argue that these processes are “selecting ...physical layer communication parameters to be used for communicating with said *one of said plurality of service groups*” as required by elements [1E] and [10E]. Instead, as is clear from a review of the many paragraphs of Currivan that Petitioner cites in support (*see* Petition at 73-76), these processes of Currivan are applied only to a single CM, *not* to a group of CMs. *See, e.g.*, Currivan, ¶¶ [0067]-[0069], [0142], [0151]-[0152], [0157], [0169], [0176]-[0177], [0182]; *see also, e.g.*, Currivan, ¶¶ [0155]-[0156], [0161]-[0163], [0175]. Each refers to “*the* CM” or “*the* transmitting device” in isolation or is a general discussion of modulation profiles in relation to each other (*e.g.*, what is “higher order” and what is “lower order”) without relation to their selection.

Accordingly, Currivan cannot make up for Cooper-Cooper840’s and Cooper-Azenkot’s failure to meet [1E] and [10E], and therefore, Grounds G-L fail to satisfy [1E] and [10E] for the same reasons discussed in relation to Grounds A and B above.

IV. CONCLUSION

All grounds of the Petition fail for a multitude of reasons. Because the Petition fails to show that there is a reasonable likelihood that Petitioner will prevail on a single claim, the Board should deny institution under 35 U.S.C. § 314(a).

Dated: April 30, 2025

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CERTIFICATION OF WORD COUNT UNDER 37 C.F.R. § 42.24(d)

The undersigned hereby certifies that the foregoing contains 11,366 words according to the word count of the word-processing software used to prepare the foregoing.

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CERTIFICATE OF SERVICE

I hereby certify that on April 30, 2025, a true and correct copy of the foregoing was caused to be served on the following counsel of record for Petitioner by electronic mail at the following addresses:

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