

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DISH NETWORK LLC, DISH NETWORK SERVICE LLC,
DISH NETWORK CORPORATION, AND
DISH NETWORK CALIFORNIA SERVICE CORPORATION,
Petitioner,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

Case IPR2024-00462
Patent 7,889,759

PATENT OWNER'S PRELIMINARY RESPONSE

TABLE OF CONTENTS

	Page
I. INTRODUCTION	1
II. PETITIONER’S GROUNDS FAIL (ALL CLAIMS, ALL GROUNDS).....	2
A. Grube And The ’759 Patent Are Fundamentally Different Systems.....	2
B. Petitioner Fails To Demonstrate That Grube Is Analogous Art (All Claims, All Grounds).	6
1. Grube And The ’759 Patent Do Not Share The Same Field Of Endeavor.	8
2. Petitioner Does Not Demonstrate Grube Is Reasonably Pertinent To The Problem The Inventors Of The ’759 Patent Were Addressing.....	16
C. Petitioner Fails To Demonstrate That Its Combination Discloses Or Renders Obvious “Determining A Common Bit-Loading Modulation Scheme For Communicating Between A Plurality Of Nodes In” “A Broadband Cable Network (‘BCN’)” (All Claims, All Grounds).....	23
D. Petitioner Fails To Demonstrate A POSITA Would Be Motivated To Combine Carhart And Grube Or Could Do So With A Reasonable Likelihood Of Success.	32
1. A POSITA Would Not Be Motivated To Modify Carhart In View Of Grube In The Ordinary Course Of Research And Development.	33
2. Carhart’s Coaxial Cable Network Has No Need For Grube’s Telephone System Solutions.	39

3. Petitioner’s Proposed Combination Is Based Upon
Impermissible Hindsight.....43

III. CONCLUSION45

TABLE OF AUTHORITIES

Page(s)

COURT DECISIONS

<i>Airbus S.A.S. v. Firepass Corp.</i> , 941 F.3d 1374 (Fed. Cir. 2019)	8
<i>Arendi S.A.R.L. v. Apple, Inc.</i> , 832 F.3d 1355 (Fed. Cir. 2016)	31
<i>C.W. Zumbiel Co. v. Kappos</i> , 702 F.3d 1371 (Fed. Cir. 2012)	24
<i>DSS Tech. Mgm’t v. Apple Inc.</i> , 885 F.3d 1367 (Fed. Cir. 2018)	31
<i>Eli Lilly & Co. v. Teva Pharms. Int’l GmbH</i> , 8 F.4th 1331 (Fed. Cir. 2021)	24, 25
<i>In re Bigio</i> , 381 F.3d 1320 (Fed. Cir. 2004)	9
<i>In re Clay</i> , 966 F.2d 656 (Fed. Cir. 1992)	7, 14, 15, 16
<i>In re Kahn</i> , 441 F.3d 977 (Fed. Cir. 2006)	27
<i>In re Klein</i> , 647 F.3d 1343 (Fed. Cir. 2011)	6
<i>In re Magnum Oil Tools Int’l, Ltd.</i> , 829 F.3d 1364 (Fed. Cir. 2016)	27
<i>In re Nat. Alts., LLC</i> , 659 Fed. App’x. 608 (Fed. Cir. 2016)	7

<i>In re NTP, Inc.</i> , 654 F.3d 1279 (Fed. Cir. 2011)	40
<i>In re Wood</i> , 599 F.2d 1032 (CCPA 1979)	8
<i>KSR Int’l Co. v. Teleflex Inc.</i> , 550 U.S. 398 (2007)	27
<i>Metalcraft of Mayville, Inc. v. Toro Co.</i> , 848 F.3d 1358 (Fed. Cir. 2017)	43, 44
<i>Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.</i> , 411 F.3d 1332 (Fed. Cir. 2005)	43
<i>Ruiz v. A.B. Chance Co.</i> , 357 F.3d 1270 (Fed. Cir. 2004)	44
<i>Schumer v. Lab. Computer Sys., Inc.</i> , 308 F.3d 1304 (Fed. Cir. 2002)	27
<i>Unigene Labs., Inc. v. Apotex, Inc.</i> , 655 F.3d 1352 (Fed. Cir. 2011)	34
<i>Wang Labs., Inc. v. Toshiba Corp.</i> , 993 F.2d 858 (Fed. Cir. 1993)	15, 23
<i>Wyers v. Master Lock Co.</i> , 616 F.3d 1231 (Fed. Cir. 2010)	8

STATUTES

<i>Apple Inc. v. Cellular Comm’ns Equipment, LLC</i> , IPR2015-00576, Paper 7 (June 12, 2015)	40
<i>F5 Networks, Inc. v. Radware, Ltd.</i> , IPR2017-00124, Paper 48 (Apr. 23, 2018)	40

SCHOTT Gemtron Corp. v. SSW Holding Co., Inc.,
IPR2013-00358, Paper 106 (Aug. 20, 2014);7

Xerox Corp. v. Bytemark, Inc.,
IPR2022-00624, Paper 9 (Aug. 24, 2022)
(precedential) 27, 36

REGULATIONS

37 C.F.R. § 42.65(a).....36

EXHIBIT LIST	
2001-2002	Reserved
2003	Declaration of Samuel H. Russ, Ph.D.
2004	Excerpts from Samuel H. Russ, <i>Signal Integrity Applied Electromagnetics and Professional Practice</i> [Signal-Integrity]
2005	OneRingNetworks, <i>What is a T1 line and How Fast is T1 Internet?</i> , September 28, 2018, https://oneringnetworks.com/what-is-a-t1-line-and-how-fast-is-t1-internet [One-Ring-Networks]
2006	Excerpts from Andrew Afflerbach, <i>Existing and Emerging Broadband Technologies</i> [CTC]
2007	Excerpts from Cable Television Laboratories, Inc., <i>Radio Frequency Interface Specification</i> , November 19, 2001 [Cable-Television-Laboratories]
2008	The Cable Center, <i>The Cable History Timeline</i> , 2014, https://syndeoinstitute.org/wp-content/uploads/2022/10/CableTimelineFall2015.pdf [Cable-History-Timeline]
2009	Sparklight Business, <i>Coaxial Cable vs. Twisted Pair</i> , https://business.sparklight.com/the-wire/tech-talk/business-internet/coaxial-cable-vs-twisted-pair (last visited May 24, 2024) [Coaxial-vs-Twisted-Pair]
2010	GNS Wireless, <i>Coaxial Cables</i> , https://www.gnswireless.com/product-category/products/coaxial-cables/ (last visited May 20, 2024) [Coaxial-Products]

I. INTRODUCTION

The Petition should be denied as it fails to demonstrate a reasonable likelihood of prevailing as to at least one challenged claim. Each of Petitioner's grounds rely upon the combination of Carhart and Grube. While Carhart is identified as the lead reference, Petitioner mostly relies upon Grube as allegedly teaching the limitations-at-issue. Grube, however, is a fundamentally different system from the '759 patent. Whereas the '759 patent concerns a broadband cable network ("BCN") wherein existing cables are utilized to enable peer-to-peer communications within the BCN, Grube, by contrast, concerns a citywide telephonic system employing twisted-pair wiring that is directed towards facilitating one-to-many and many-to-one communications within that framework. Similarly, Grube is also far afield of Carhart which, like the '759 patent, concerns a local area coaxial cable network, not the backhaul infrastructure for a citywide twisted pair telephonic system. *See* Section II.A.

As a consequence of the profound differences between the '759 patent and Grube, Petitioner fails to even prove that Grube is analogous art that is eligible for use as prior art in an obviousness combination. The '759 patent is in the field of broadband cable networks, particularly those utilizing coaxial cable, and directed toward solving the problems inherent to preexisting coaxial cable networks within a building. Grube, by contrast, is in the field of twisted-pair telephone lines and

directed toward solving the problems inherent to twisted-pair telephone lines in a citywide network. *See* Section II.B. The significant differences between Grube’s twisted-pair teachings and coaxial cable are pervasive, and, unsurprisingly, the Petition does not prove that the Carhart-Grube combinations render obvious that the “common bit-loading modulation scheme” is “for communicating between a plurality of nodes in a broadband cable network.” Section II.C. Petitioner, moreover, fails to prove that a POSITA would be motivated to add Grube’s twisted-pair teachings to Carhart’s coaxial cable system or could do so with a reasonable likelihood of success. *See* Section II.D.

II. PETITIONER’S GROUNDS FAIL (ALL CLAIMS, ALL GROUNDS).

A. Grube And The ’759 Patent Are Fundamentally Different Systems.

The ’759 patent is directed towards a broadband cable network (“BCN”) utilizing coaxial cable. More specifically, the ’759 patent’s inventive system facilitates peer-to-peer communications between various types of customer premises equipment within a BCN within a building (*e.g.*, a home). Ex. 2003 [Russ-Decl.] ¶ 32; Ex. 1001 [’759] 3:63-4:3. These BCNs utilize coaxial cable, which are shielded and thus have high bandwidths of, *e.g.*, 50 MHz. Ex. 1001 [’759] 7:23-26; *see also* Ex. 2003 [Russ-Decl.] ¶¶ 33-34 (discussing Ex. 2004 [Signal-Integrity] 82).

The '759 patent addresses a problem with preexisting BCNs within a building wherein signal is distributed throughout the network with “splitters,” resulting “in significant isolation between the various CPEs.” Ex. 1001 ['759] 3:63-4:3; Ex. 2003 [Russ-Decl.] ¶¶ 35-37.

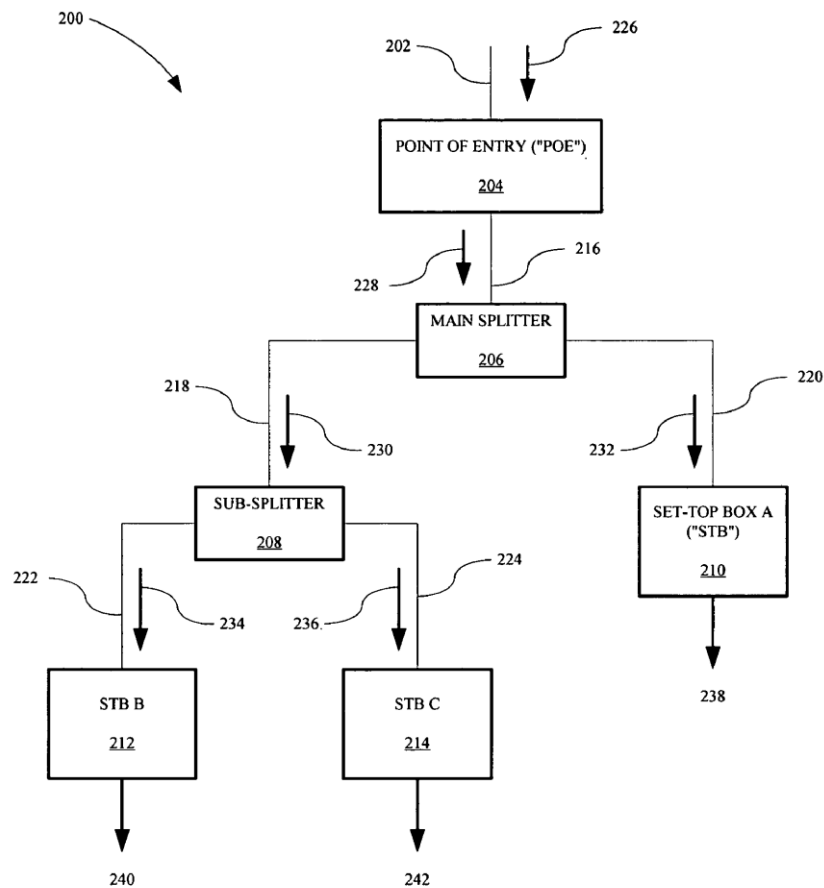


FIG. 2 (Prior Art)

Ex. 1001 ['759] Fig. 2; Ex. 2003 [Russ-Decl.] ¶¶ 35-37. This “isolation results in

difficulty for transmitting two-way communication data between the different CPEs,” thus frustrating direct peer-to-peer communications. Ex. 1001 [’759] 3:44-62; Ex. 2003 [Russ-Decl.] ¶¶ 35-37. To address this issue, the ’759 patent “determin[es] a common bit-loading modulation scheme for communicating between” the CPEs. Ex. 2003 [Russ-Decl.] ¶ 37 (discussing Ex. 1001 [’759] 4:7-9, 7:5-12).

Petitioner’s primary reference, Carhart, like the ’759 patent, also concerns in-home coaxial cable. Ex. 1009 [Carhart] 4:52-53 (“The present invention makes unique use of new and existing *in-home coaxial wiring* systems”); Ex. 2003 [Russ-Decl.] ¶ 38. Consequently, Carhart concerns a system with high bandwidth that must address the particular technical complexities inherent in coaxial cable within a local network. Ex. 2003 [Russ-Decl.] ¶ 38.

Grube, relied upon by Petitioner in every ground, concerns a fundamentally different system. In stark contrast to the ’759 patent (and Carhart), Grube has nothing to do with broadband, cable, coaxial cable, or the local networks that lie at the heart of the ’759 patent. Ex. 2003 [Russ-Decl.] ¶ 39; *see generally* Ex. 1010 [Grube]. Rather, Grube addresses a citywide telephonic infrastructure utilizing twisted-pair telephone lines. Ex. 2003 [Russ-Decl.] ¶ 39 (discussing Ex. 1010 [Grube] 6:54-57, 6:65-67, 9:40-45, 12:31-32, 13:35-37); *id.*, ¶ 42 (discussing Ex. 1010 [Grube] Fig. 8, 8:15-8:27).

Twisted-pair telephone lines are unshielded, resulting in only low frequencies being successfully transmitted, and thus, low bandwidth. Ex. 2003 [Russ-Decl.] ¶ 40 (discussing Ex. 1010 [Grube] Fig. 4; Ex. 2004 [Signal-Integrity] 107, 112-115, 121). Because of this low bandwidth, communications over twisted-pair telephone lines have traditionally been only one-to-one. *Id.*, ¶ 41; see Ex. 1010 [Grube] 2:45-47, 2:53-55, 4:18-22.. Grube teaches that “[t]o enhance the transmit capabilities of a twisted pair copper telephone line, several techniques have been developed.” Ex. 1010 [Grube] 2:34-36; Ex. 2003 [Russ-Decl.] ¶ 39. One such technique is “Asymmetrical Digital Subscriber Loop, or Link, (ADSL)” which “increases the bandwidth of the twisted pair telephone line”—albeit to a still much lower bandwidth than coaxial cable—“up to 1.1 MHz.” Ex. 1010 [Grube] 2:52-53; Ex. 2003 [Russ-Decl.] ¶ 41. Despite the increased bandwidth, ADSL is still only “used for one-to-one communications.” Ex. 1010 [Grube] 2:53-55; Ex. 2003 [Russ-Decl.] ¶ 41.

Grube’s intention thus is to take advantage of the increased bandwidth from ADSL and add capability for one-to-many/many-to-many communications in its twisted-pair telephone line system. Ex. 1010 [Grube] 4:18-2. Grube accomplishes this by utilizing a “primary site” at the headend that communicates with Grube’s “secondary sites” spread across, *e.g.*, an entire city. Grube’s “secondary sites” are the entry points for particular buildings (*e.g.*, an apartment building with multiple

units) which in turn communicate with multiple “subscribers” such as pagers, telephones, or televisions. Ex. 2003 [Russ-Decl.] ¶ 42 (discussing Ex. 1010 [Grube] Fig. 8, 6:65-67, 8:28-37, 8:28-64, Figs. 1, 2). This primary site transmits calls to the secondary sites, allocating channels to each call such that it occupies the minimum number of channels possible. Ex. 2003 [Russ-Decl.] ¶ 45 (discussing Ex. 1010 [Grube] Fig. 29, 32:45-55, 33:5-26). In this way, Grube reserves as much open bandwidth as possible to service potential future calls. *Id.*

Thus, Grube concerns fundamentally different technologies with fundamentally different problems and goals from the ’759 patent and Carhart. These differences are consequential—especially as Petitioner relies heavily upon Grube’s teachings for all grounds—and Petitioner fails to demonstrate a reasonable likelihood of prevailing as to at least one challenged claim.

B. Petitioner Fails To Demonstrate That Grube Is Analogous Art (All Claims, All Grounds).

Every ground of the Petition (Pet., 2) relies upon combinations with Grube, but the Petition fails to prove Grube is analogous art. “A reference qualifies as prior art for an obviousness determination . . . only when it is analogous to the claimed invention.” *In re Klein*, 647 F.3d 1343, 1348 (Fed. Cir. 2011) . An obviousness ground that relies upon non-analogous art fails. *Id.*, 1352. “Petitioner bears the burden of showing by a preponderance of evidence that the asserted prior

art references are analogous art.” *SCHOTT Gemtron Corp. v. SSW Holding Co., Inc.*, IPR2013-00358, Paper 106, 26 (Aug. 20, 2014); *In re Nat. Alts., LLC*, 659 Fed. App’x. 608, 613-14 (Fed. Cir. 2016) (nonprecedential).

To be analogous, a reference must be either (1) from the same field of endeavor as the patent-at-issue, or (2) reasonably pertinent to the particular problem with which the inventor of the challenged patent is involved. *In re Clay*, 966 F.2d 656, 658-59 (Fed. Cir. 1992). Petitioner, however, fails to prove that Grube is analogous under either prong. Whereas the ’759 patent’s field is broadband cable networks, particularly those involving coaxial cable, Grube’s twisted-pair telephonic system is far afield and has nothing to do with either broadband or cable. *See* Section II.B.1. And whereas the ’759 patent is directed towards using preexisting coaxial cables within a building to enable communication between nodes within a broadband cable network, Grube is directed towards the very different problem of facilitating one-to-many or many-to-one communications within a citywide twisted-wire telephonic network. *See* Section II.B.2. Because Petitioner’s grounds necessarily rely upon non-analogous art (Grube), they must be rejected.

1. Grube And The '759 Patent Do Not Share The Same Field Of Endeavor.

The '759 patent and Grube do not share the same field. The '759 patent's field of endeavor—as confirmed by its title, abstract, field of endeavor, figures, written description, and claims—is “broadband cable networks,” particularly those using coaxial cable. Grube, by contrast, has nothing to do with either broadband or cable. Rather, Grube's field is twisted-pair telephonic systems and are far removed from the coaxial BCNs that are the subject of the '759 patent.

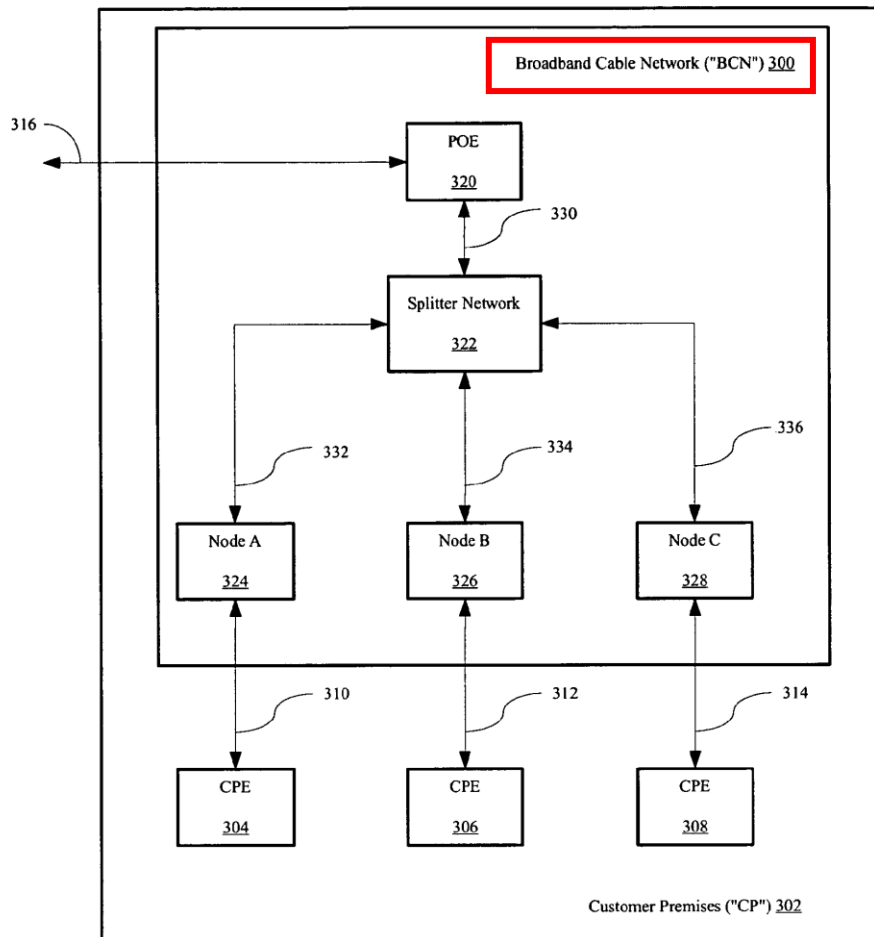
To discern the field of endeavor, the Federal Circuit has often looked to a patent's “background of invention” and “field of the invention” sections.¹ Additionally, a patent's title, claim preamble, and function and structure of the claimed inventions may also bear upon the field of endeavor. *Airbus*, 941 F.3d at 1380-81 (affirming Board's finding of field of endeavor based on “the title of the []

¹ See, e.g., *In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979) (determining field of endeavor based on “Background of Invention”); *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1237-38 (Fed. Cir. 2010) (similar); *Airbus S.A.S. v. Firepass Corp.*, 941 F.3d 1374, 1381 n. 8 (Fed. Cir. 2019) (“[T]he specification of each reference includes a ‘Field of the Invention’ section that distinctly describes each applicable field of endeavor.”).

patent and the preamble of a ... claim”); *In re Bigio*, 381 F.3d 1320, 1326 (Fed. Cir. 2004) (“The Board thus correctly set the field of the invention by consulting the structure and function of the claimed invention as perceived by one of ordinary skill in the art.”).

Here, each of these traditional sources for identifying a field of endeavor unanimously confirms that the ’759 patent’s field is broadband cable networks, and particularly those utilizing coaxial cable. Ex. 2003 [Russ-Decl.] ¶ 49. The ’759 patent’s title and abstract both concern a “broadband cable network” and the ’759 patent’s “field of invention” similarly identifies “broadband communication networks,” particularly those “utilizing coaxial cable.” Ex. 1001 [’759] 1:39-42. The Background of the Invention also focuses upon broadband cable networks utilizing coaxial cable. Ex. 1001 [’759] 1:45-63; 2:23-31. The ’759 patent further addresses “a need” for a system that uses an “existing coaxial cable network” to connect consumer premises equipment within a local network. *Id.*, 3:66-4:3.

Similarly, each of the claims is directed towards “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in a **broadband cable network** ...” *Id.*, cls. 1-23. Each of the ’759 patent’s embodiments, like the claims, is directed towards a “Broadband Cable Network,” as reflected in Figure 3 below:



Ex. 1001 [’759] Fig. 3. Similarly, the other figures either refer to prior art “broadcast cable system[s]” or refer back (directly or indirectly) to Figure 3’s “broadcast cable network.” *Id.*, 4:58-5:28. Looking beyond the claims, “broadband” and “broadband cable networks” (abbreviated as BCNs) are discussed pervasively throughout the disclosure and appear over 100 times in the ’759 patent. Similarly, “coaxial cable” appears dozens of times. Ex. 2003 [Russ-Decl.] ¶ 53.

And there can be little doubt concerning the ’759 patent’s field. Petitioner

concedes that “[t]he ’759 patent describes a broadband cable network (‘BCN’).”

Pet., 4. Dr. Williams similarly recognizes that “[t]he technology described in the ’759 patent applies to a broadband cable network (‘BCN’).” Ex. 1004 [Williams-Decl.] ¶ 28.

Grube’s field is not “broadband cable networks.” Grube never discusses or mentions a broadband cable network. Indeed, Grube does not mention “broadband” at all, and the only mention of “cable” is a solitary reference to a “cable box”—a device, not a network. See Ex. 1010 [Grube] 12:65-68; Ex. 2003 [Russ-Decl.] ¶ 54. As Dr. Russ explains, Grube instead concerns twisted-pair telephone networks:

There is no reason to believe that Grube’s field has anything to do with “broadband cable networks.” Rather, Grube is directed to networks that use twisted pair telephone wires, not cable, much less coaxial cable. Ex. 1010 [Grube] 6:54-57 (“Generally, the present invention provides a method and apparatus for establishing a communication system infrastructure *utilizing low pass transmission path, i.e. twisted pair telephone line.*”); see also 6:65-67; 9:39-45 ; 12:30-31 ; 13:35-37 ; see also 1:20-23 ; Ex. 2005 [One-Ring-Networks] 1. Petitioner and Dr. Williams similarly acknowledge Grube’s focus upon “telephone lines.” See Pet., 12 (“Grube focuses on improving reliability and bandwidth over existing wiring, e.g., telephone lines.”); Ex. 1004 [Williams-Decl.] ¶ 78 (“Grube focuses on improving reliability and bandwidth over existing telephone lines”).

Ex. 2003 [Russ-Decl.] ¶ 55.²

The difference matters. There are substantial physical differences between twisted-pair wires and coaxial cable which mean they have significantly different capabilities, network configurations, and shortcomings. Ex. 2003 [Russ-Decl.] ¶ 56 (discussing Exs. 2004, 2009). The frequencies and corresponding wavelengths differ dramatically due to coaxial cable’s superior shielding and precisely controlled geometries at manufacturing. *Id.* One consequence of these physical differences is that Grube’s network using twisted pair wires would not be considered broadband, at least at the time of the ’759 patent’s invention. Ex. 2003 [Russ-Decl.] ¶ 55. And indeed, whereas Grube contemplates a bandwidth of only 1.1 MHz (Ex. 1010 [Grube] 15:43-50, 16:27-30, 52:3-6), the ’759 patent refers to a bandwidth of, *e.g.*, 50 MHz—over 45 times broader than Grube (Ex. 1001 [’759] 7:23-26). Ex. 2003 [Russ-Decl.] ¶ 57. Petitioner’s other reference, Carhart, refers to broadband systems with “typical[]” frequencies of “about 50 MHz to about 550 MHz” (*i.e.*, 455x broader). Ex. 1009 [Carhart] 1:42-48; *see, e.g.*, Ex. 2006 [CTC] 7. Twisted-pair phone wires and Grube’s use of them are very different as compared to the broadband coaxial cable network of the ’759 patent.

Consequently, Grube is not directed toward “broadband cable networks,”

² Some parenthetical quotations omitted.

much less “broadband cable networks” using coaxial cable. Conversely, the ’759 patent never mentions “twisted pair cabling” or the like. Each of Grube and the ’759 patent belong to their own distinct fields of endeavor.

Petitioner, for its part, asserts that, “Grube[] and the ’759 patent are from the same field of endeavor—multiplex communication networking.” Pet., 22 n.5 (citing Ex. 1001 [’759] 1:40-42, 3:62-4:3; Ex. 1010 [Grube] 1:6-8, 4:19-26). But this cannot be. “Multiplexing” is mentioned only once in the ’759 patent at 7:19-20 in connection with the acronym OFDM. No explanation is given for why the ’759’s patent’s field of endeavor would be revealed in an isolated reference in its seventh column, rather than, *e.g.*, its title, abstract, field of invention, background of the invention, claims, and embodiments. And, the sections of the ’759 patent that Petitioner cites as allegedly supporting a field of “multiplex communication networking” do not mention “multiplex” at all. Ex. 1001 [’759] 1:40-42 (“The invention relates to broadband communication networks, and in particular to broadband communication networks utilizing coaxial cable.”); 3:62-4:3 (“Therefore, there is a need for a system and method to connect a variety of CPEs into a local network, such as local-area network (‘LAN’), within a building such as a home or office. Additionally, there is a need for a system and method to connect a variety of CPEs into a local network, such as a LAN, within a building such as a home or office while allowing the utilization of an existing coaxial cable network

within the building.”). Notably, in making its assertion, Petitioner does not mention broadband cable networks or coaxial cable which is plainly the ’759 patent’s technological field and the overwhelming focus of the ’759 patent’s disclosure. Nor does Petitioner mention Grube’s focus upon twisted-pair telephone systems. Quite simply, Petitioner has provided only a conclusory identification of potential areas of technological overlap between the ’759 patent and Grube without any convincing account of why these overlapping areas define the field for either the ’759 patent or Grube. Ex. 2003 [Russ-Decl.] ¶¶ 56-58.

Instead, Petitioner’s approach of identifying cherry-picked, incidental technological overlap has long been rejected. Under Federal Circuit precedent, even art with substantial similarities and in the same technological area as the patent-at-issue may not be in the same field. *Clay*, the leading analogous art decision, is instructive. There, a finding of analogous art was “clearly erroneous” where the patent-at-issue and the allegedly analogous art (Sydansk) were two patents owned by the same company (Marathon Oil) and the patent-at-issue concerned a gel for use in the petroleum industry while Sydansk concerned a “similar” gel for use in the petroleum industry. *Clay*, 966 F.2d at 657-60. As to the field-of-end endeavor test, the Court found that the Board clearly erred in finding Sydansk was analogous because the patent-in-question’s “field of endeavor is the *storage* of refined liquid hydrocarbons” whereas “[t]he field of endeavor of

Sydansk’s invention ... is the *extraction* of crude petroleum.” *Id.*, 659 (italicization in original). Thus, the “storage” and “extraction” of oil are two separate fields.

Similarly, semiconductor “memory” is likewise too broad a field. As the Federal Circuit found:

The Allen-Bradley art is not in the same field of endeavor as the claimed subject matter merely because it relates to memories. It involves memory circuits in which modules of varying sizes may be added or replaced; in contrast, the subject patents teach compact modular memories.

Wang Labs., Inc. v. Toshiba Corp., 993 F.2d 858, 864-65 (Fed. Cir. 1993).

Thus, in *Clay* despite a similar gel used, in both cases, in the petroleum industry the references were not the same field because they did not deploy to the same endeavor—storage vs. extraction. Likewise, the generic categorization of references as “memory” was insufficient in *Wang Labs.*

Here too, that there may be passing discussion of multiplexing in the ’759 patent (a single mention) and Grube does not indicate the field of endeavor for either because they deploy to very different physical media (coaxial cable vs. twisted-pair telephone lines), with different characteristics, issues and bandwidths.

2. Petitioner Does Not Demonstrate Grube Is Reasonably Pertinent To The Problem The Inventors Of The '759 Patent Were Addressing.

Neither Petitioner nor Dr. Williams establishes that Grube is reasonably pertinent to the problem the inventors of the '759 patent were addressing. Indeed, Petitioner never identifies the problem with which Grube addresses. Instead, Petitioner only asserts that Grube (and Carhart) “concern broadcasting and BCNs.”

Petitioner’s failure to even identify the problem Grube was addressing is a critical failing as “the purposes of both the invention and the prior art are important in determining whether the reference is reasonably pertinent to the problem the invention attempts to solve,” and if the reference “is directed to a different purpose, the inventor would accordingly have had less motivation or occasion to consider it.” *Clay*, 966 F.2d at 659. Further, “when addressing whether a reference is analogous art with respect to a claimed invention under a reasonable-pertinence theory, ***the problems to which both relate must be identified and compared.***” *Donner Tech., LLC v. Pro Stage Gear, LLC*, 979 F.3d 1353, 1359 (Fed. Cir. 2020). Here, Petitioner does not attempt to identify Grube’s problem or compare that problem to the problem with which the inventors of the '759 patent were concerned. Thus, Petitioner has not carried its burden.

Furthermore, Grube is not reasonably pertinent to the problem the '759 patent’s inventors were trying to solve. The '759 patent is directed towards a

problem with broadband cable networks within a building. Ex. 2003 [Russ-Decl.]

¶¶ 60-62. Under existing BCNs, broadcast signals are received at a point-of-entry (Ex. 1001 [’759] 1:47-51) and then distributed from that POE to various nodes connected to various types of customer premise equipment (*id.*, 1:51-61). Ex. 2003 [Russ-Decl.] ¶ 62. Such prior art systems are illustrated, *e.g.*, in annotated Figure 2 below.

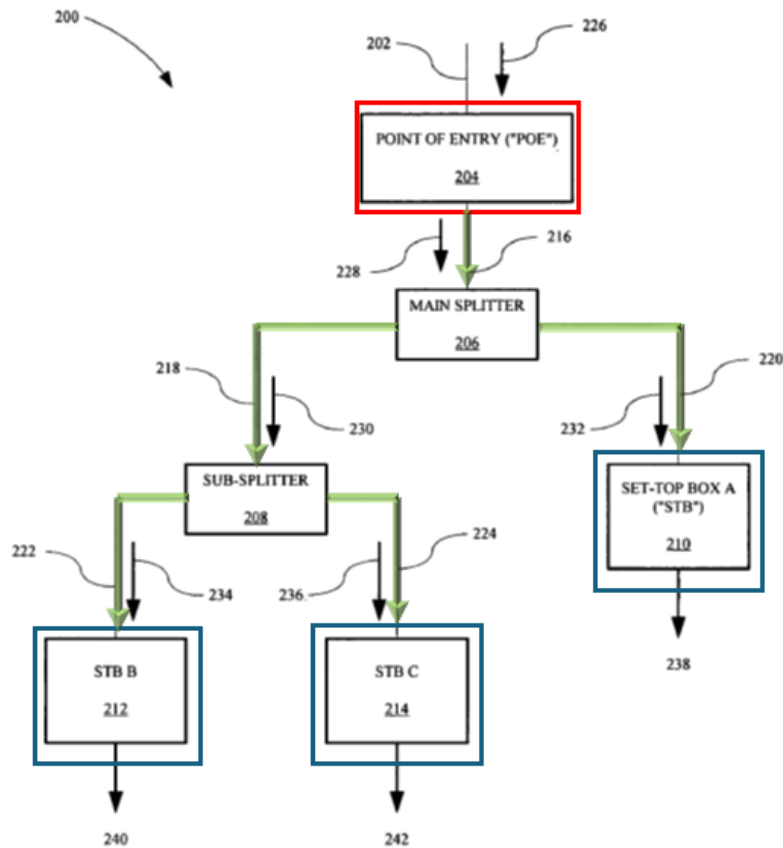


FIG. 2 (Prior Art)

Ex. 1001 ['759] Fig. 2 (annotated).

A major difficulty in peer-to-peer communications in such systems results from the use of splitters as shown, *e.g.*, in Figure 2. Ex. 2003 [Russ-Decl.] ¶ 63. As a result of this configuration, “most broadband cable networks ... presently utilized within most existing buildings are not configured to allow for easy networking ***between CPEs because most broadband cable networks utilize broadband cable splitters*** ...” Ex. 1001 ['759] 3:22-30. As the '759 patent further explains, “the splitters typically have a high level of isolation between the different connected terminals resulting in significant isolation between the various CPEs” and this “isolation creates a difficult environment to network between the different CPEs because the isolation results in difficulty for transmitting two-way communication data between the different CPEs.” *Id.*, 3:50-62.

The '759 patent thus addresses a need to “connect a variety of CPEs into a local network ... while allowing the utilization of an existing coaxial cable network within the building.” *Id.*, 3:63-4:3; *see also id.*, 3:8-14 (“... there is a growing need for different CPEs to communicate between themselves in a network type of environment within the building.”); Ex. 2003 [Russ-Decl.] ¶ 63.

Grube, by contrast, is directed towards an entirely different problem in an entirely different portion of a signal path. Indeed, despite Petitioner’s assertion otherwise, Grube does not “concern ... BCNs” (Pet., 23) and rather concerns

improving twisted-pair telephonic systems. Ex. 1010 [Grube] 4:22-26. Grube seeks to improve upon prior telephonic communication systems by adding a primary site at the remote headend to allow “one-to-many or many-to-one communications” between the headend and receivers. Grube has nothing to do with allowing devices within a building to directly communicate with one another. As Dr. Russ explains:

Grube addresses a need “for 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. 1010 [Grube] 4: 22-26.

To address this need, Grube teaches the use of a “primary site” which routes calls to various secondary sites (receivers) which are in turn affiliated with various subscribers (e.g., pagers, phones, faxes). Ex. 1010 [Grube] Abstract, Fig. 8, 6:65-7:31. Importantly, the secondary sites receive all communication from the primary site and not from each other. *Id.*, Fig. 8, 8:32-65.

Ex. 2003 [Russ-Decl.] ¶¶ 65-66.

Grube’s problem has nothing to do with connecting devices within a building’s network. As Dr. Russ explains:

The problems the ’759 patent and Grube address are simply entirely different from each other, dealing with different parts of signal transmission and the different issues that arise due to the different wires

the '759 patent uses (coaxial cable) and Grube uses (twisted pair). Again, the '759 patent addresses issues with devices within a building communicating with each other, in a peer-to-peer manner, at high frequencies (*e.g.*, 800 MHz). Grube addresses issues with a single citywide-scale headend transmitting signals to multiple receivers or receiving signals from those receivers at much lower frequencies (*e.g.*, 1 MHz). *See* Ex. 1010 [Grube] 8:23-26 (“if the secondary sites are separated by more than a given geographic distance (**12 Kft to 18Kft**) from the primary site, repeaters 144, 146 may be required.”). Grube’s receivers or secondary sites are more akin to the points of entry to buildings described in the '759 patent rather than the terminal devices within those buildings the '759 patent allows to communicate with each other.

Ex. 2003 [Russ-Decl.] ¶ 67.

Grube and the '759 patent are not only directed towards different problems, Grube’s solutions have no relevance to the problems the '759 patent’s inventors were trying to solve in view of the dramatic differences between twisted pair telephonic systems and coaxial cable. Per Dr. Russ:

Petitioner and Dr. Williams overlook that the physical media involved (coaxial cable versus twisted-pair phone lines) are substantially different and so a POSITA would know that a solution for one (*e.g.*, twisted-pair phone lines) would not be relevant to the other (*e.g.*, coaxial cable). To illustrate this point, consider the language of Grube. It consistently (over 27 times) refers to the phone line as a “low

pass transmission path.” *E.g.*, Ex. 1010 [Grube] 6:59-62 (“The primary site is coupled to a plurality of secondary sites via **low pass transmission paths**.”). This is correct—a twisted pair phone line acts like a low pass filter over distance. The twisted-pair structure is unshielded (for cost reasons), which leads to a loss of signal energy over distance. Electrically, therefore, the medium appears as a low-pass filter. In other words, the twisted-pair wiring causes higher frequencies to be filtered out, leaving only low frequencies successfully transmitted. This is why the diagrams in Grube (*e.g.*, Fig. 4) show a 1.1 MHz bandlimit. This is also the technical reason why nearly all phone lines are point-to-point connections—they cannot carry enough information to distribute information to multiple users. Grube attempts to address the lack of point-to-multipoint connections but cannot address the more fundamental issue that twisted-pair is unsuitable for it.

Conversely, coaxial cable, because of its shielding and tightly controlled impedance, can carry signals at a much higher frequency. *Contrast, e.g.*, Ex. 1009 [Carhart] 1:43-48 (“typical[]” CATV uses bandwidth “from about 50 MHz to about 550 MHz”) *with* Ex. 1010 [Grube] Fig. 4 (showing a 1.1 MHz bandlimit). The differences between the physical properties of coaxial and telephone cabling are particularly noticeable at high frequency. Transmitting signals at a higher frequency over telephone lines actually results in higher losses and drops in signal strength. *See* Ex. 1010 [Grube] Fig. 2 (drops in bit-loading as frequency goes up). Meanwhile, at high frequencies, the behavior of coaxial cable is well-known to be chaotic, with sharp

increases in attenuation at very specific frequencies. ... This is seen, *e.g.*, in Fig. 9 of the '759 patent.

... Significantly, the problems that Grube seeks to address in the context of citywide telephonic infrastructure had already long been solved at a macro level in cable infrastructure, *i.e.*, at the operator-to-premises level. Indeed, the industry standard for one-to-many/many-to-one communications in cable between a headend and buildings had already been established in 1997, well before the time of the invention. Ex. 2007 [Cable-Television-Laboratories] 150 (discussing such broadcasting). To be sure, however, Grube (and DOCSIS for that matter), are one further step removed from—and share no relevant characteristics with—a local BCN much less any communications between devices within that BCN.

Ex. 2003 [Russ-Decl.] ¶¶ 68-70.

Thus, Grube and the '759 patent are directed to different problems and the issues Grube addresses have no bearing upon coaxial cable much less in the context of a BCN. And, the fact that the '759 patent and Grube may have some technological overlap is immaterial as even technologically similar references may not be reasonably pertinent. *Clay* found it was “clearly erroneous” to consider *Sydansk* as reasonably pertinent because a POSITA “would not reasonably have expected to solve the problem of dead volume in tanks for storing refined petroleum by considering a reference dealing with plugging underground

formation anomalies.” *Clay*, 966 F.2d at 660; *see also Wang*, 993 F.2d at 864 (prior art memory modules not reasonably pertinent to patented memory modules); *Polygroup Ltd. v. Willis Elec. Co., Ltd.*, IPR2016-01610, Paper 187, 31, 35-40 (Feb. 26, 2018) (rejecting argument that “structurally and functionally similar” electrical connectors in reference and patent made reference reasonably pertinent).

Thus, Petitioner fails to demonstrate that Grube is analogous art to the ’759 patent, and consequently, all of Petitioner’s grounds fail.

C. Petitioner Fails To Demonstrate That Its Combination Discloses Or Renders Obvious “Determining A Common Bit-Loading Modulation Scheme For Communicating Between A Plurality Of Nodes In” “A Broadband Cable Network (‘BCN’)” (All Claims, All Grounds).

Each of the claims require “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in” a “broadband cable network (‘BCN’).” Ex. 1001 [’759] cls. 1-7, 14, 20, 22. Although this language appears in the preambles, it is limiting because it provides the antecedent basis for the subsequent elements reciting “*the* common bit-loading modulation scheme” of each claim. Petitioner does not argue that the preambles are not limiting. *E.g.*, Pet., 26.

Petitioner contends that this limitation is satisfied by “the Carhart and Grube combination” (Pet., 26) but neither Carhart nor Grube discloses using a “common bit-loading modulation scheme *for* communicating between a plurality of nodes.”

Rather, as Petitioner implicitly concedes, Carhart does not teach a “common bit-loading modulation scheme,” let alone one “for communicating.” *See id.*, 28 (not relying on Carhart for the “common bit-loading modulation scheme”); 39 (“In Carhart-Grube, **Grube** discloses or renders obvious determining a common bit-loading scheme for communicating between its plurality of sites from the bit-loading information responses transmitted by the secondary sites.”). And Grube’s “outbound control channel bit loading table” (the alleged common bit-loading modulation scheme) is not used **for** communicating. Rather, it is an interim step to achieve Grube’s actual goal—minimizing the number of carrier channels employed in order to keep as much bandwidth available as possible for potential future calls.

Returning to the claims, the preamble is limiting because “**a** common bit-loading modulation scheme” provides the prior antecedent basis for “**the** common bit-loading modulation scheme” in the body of the claim. Ex. 1001 [’759] cls. 1-7, 14, 20, 22. It is well-settled that “the preamble constitutes a limitation when the claim(s) depend on it for antecedent basis, or when it is essential to understand limitations or terms in the claim body.” *C.W. Zumbiel Co. v. Kappos*, 702 F.3d 1371, 1385 (Fed. Cir. 2012); *Eli Lilly & Co. v. Teva Pharms. Int’l GmbH*, 8 F.4th 1331, 1341 (Fed. Cir. 2021) (“we held that a statement of intended use—‘[a] repetitive motion pacing system for pacing a user’—was limiting because the term ‘user’ in the preamble provided antecedent basis for that term later in the body of

the claim.”). This conclusion is further reinforced by the fact that four of the independent claims (claims 1-4) are method claims and “statements of intended purpose in methods of using apparatuses ... has tended to result in a conclusion that such preamble language is limiting.” *Eli Lilly*, 8 F.4th at 1341.

Moreover, “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in a broadband cable network” also lies at the heart of the claimed inventions. As Dr. Russ explains:

As previously explained, the ’759 patent’s field is “broadband cable networks” and the ’759 patent is directed towards enabling peer-to-peer communication among terminal devices (“nodes”) within a BCN. ... The ’759 patent addresses a need to “**connect a variety of CPEs** into a local network, such as a LAN, within a building such as a home or office while allowing the utilization of an existing coaxial cable network within the building.” *Id.*, 3:63-4:3; *see also id.*, 3:8-14 (“there is a growing need **for different CPEs to communicate between themselves in a network type of environment within the building.**”); 7:5-12 (“Physically the channels typically vary in length between nodes and electrically vary because of the paths through and reflections from the various cables, switches, terminals, connections, and other electrical components in the cable network.”).

To solve this problem, the ’759 patent teaches an inventive “common bit-loading modulation scheme” which is used “for communicating between a plurality of nodes in the BCN.” Ex. 1001

[’759] Abstract; 4:5-40 (describing determination of “common bit-loading modulation scheme for communicating between a plurality of nodes in the BCN” in summary of invention); 6:63-67 (“in order to [e]nsure that both **node B 504 and node C 506 receive the transmissions broadcast signal from node A 502, node A 502 utilizes a bit-loading modulation scheme that is known as a common bit-loaded modulation scheme.**”); 10:6-14 (similar).

Thus, “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in” a “broadband cable network” goes to the heart of the ’759 patent’s inventions.

Ex. 2003 [Russ-Decl.] ¶¶ 75-77.

Petitioner, however, fails to prove the element is met. Neither Carhart nor Grube teach these limitations. Petitioner alleges that in its combination, “**Grube** discloses or renders obvious determining a common bit-loading scheme for communicating between its plurality of sites from the bit-loading information responses transmitted by the secondary sites.” Pet., 39. But, even if, *arguendo*, Grube disclosed a “common bit-loading modulation scheme,” it is (1) not used “for communicating between a plurality of nodes,” (2) nor used in a BCN. *See, e.g.*, Sections II.A, II.B.1, *supra*.

Notably, beyond a bald assertion that it does, Petitioner never establishes that or explains why Grube’s “outbound control channel bit loading table” is “for communicating between its plurality of sites.” *See* Pet., 39-42. Petitioner cites Dr.

Williams’s declaration at paragraphs 136-141 as support, but these are of no help as Dr. Williams simply repeats the same assertion. Ex. 1004 [Williams-Decl.]

¶¶ 136-141. This conclusory testimony is insufficient to show disclosure.

Schumer v. Lab. Computer Sys., Inc., 308 F.3d 1304, 1315-16 (Fed. Cir. 2002)

(“testimony [concerning anticipation] is insufficient if it is merely conclusory.”);

Xerox Corp. v. Bytemark, Inc., IPR2022-00624, Paper 9, 15-16 (Aug. 24, 2022)

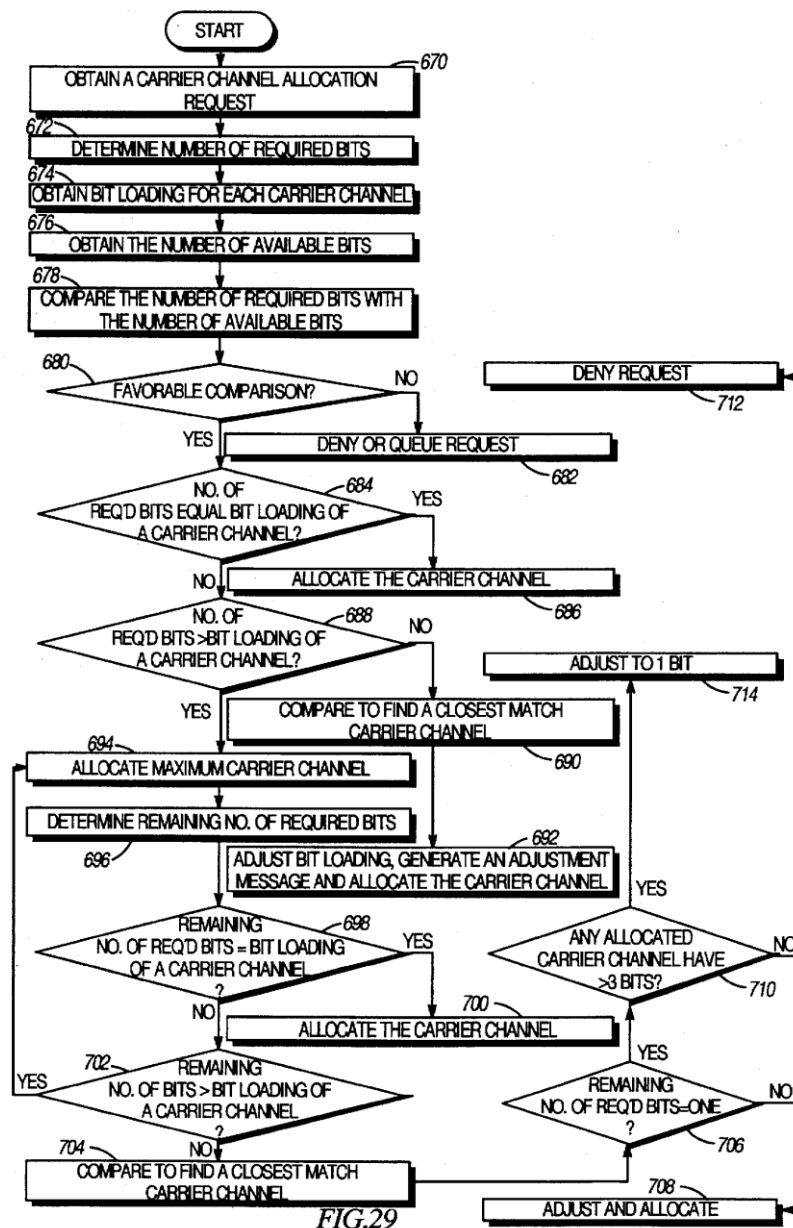
(precedential).

Moreover, it is well-settled that obviousness may not be shown through conclusory statements. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”); *In re Magnum Oil Tools Int’l, Ltd.*, 829 F.3d 1364, 1380 (Fed. Cir. 2016) (“To satisfy its burden of proving obviousness, a petitioner cannot employ mere conclusory statements. The petitioner must instead articulate specific reasoning, based on evidence of record, to support the legal conclusion of obviousness.”). This alone should be fatal.

If more is needed, Grube’s “outbound control channel bit loading table” is not used “for communicating.” Rather, Grube has a “primary site” that uses its bit-loading tables to estimate and intelligently minimize overall resource use. Grube’s

primary site attempts to minimize the number of channels deployed to support a given call routed to/from particular secondary site(s), so that the overall pool of ADSL channels in the backhaul infrastructure (between primary and secondary sites) is kept as available as possible for potential future usage by other calls. The primary site uses the bit-loading tables to inform it as to the number of channels likely needed to establish a link with a given connected site. As Dr. Russ explains:

Grube teaches that its “LCD bit-loading tables” (also referred to as “ordered bit-loading tables” or “outbound control channel bit loading table”) are used to minimize the number of carrier channels used to support each call. See Ex. 1010 [Grube] 21:60-63 (“From these bit loading tables 434, 436, a carrier channel or carrier channels is selected to support the inbound control channel for each set.”). This is because of twisted-pair’s shortcoming of having a limited frequency bandwidth with which to deliver transmissions. Grube’s process can be seen illustrated in Figure 29:



Id., Fig. 29. As can be seen above, the primary site receives a “carrier channel allocation request” (also called a “call request” in Grube) (step 670) and “determines a number of required bits” based on the call type. *Id.*, 32:54-57. The primary site then “accesses an ordered bit loading table” (*id.*, 33:5-7) and then, using the table, either “queues

or denies the request,” “allocates the carrier channel having the bit loading which matches the number of required bits to the carrier channel request” if there is one, or “allocates the carrier channel[s] having the maximum bit loading, i.e., the maximum carrier channel, to the carrier channel request” until “the particular carrier channel allocation request has been allocated a sufficient number of carrier channels to fulfill the bandwidth requirements of the service being requested.” *Id.*, 33:60-67. Thus, Grube’s alleged common bit-loading scheme is not used to enable peer-to-peer communication between secondary sites, but rather simply to minimize the number of channels allocated to a particular call with the ultimate goal of servicing more than one call at a time. These calls are routed between a primary site and a secondary site, not between two secondary sites. Significantly, this is the opposite of what the ’759 patent teaches its bit-loading is for. Ex. 1001 [’759] 7:12-14 (“Bit-loading is the process of optimizing the bit distribution to each of the channels to ***increase throughput.***”).

Ex. 2003 [Russ-Decl.] ¶ 80.

Thus, Grube’s bit-loading tables are not used “for communicating between a plurality of nodes.” Rather, Grube’s table is merely a reference to which a primary site looks for information when assigning the minimum number of carrier channels needed for any given call.

Consequently, neither Carhart nor Grube teaches the required “common bit-loading modulation scheme ***for*** communicating between a plurality of nodes” “in a

broadband cable network.” The Federal Circuit has stressed the stringent requirements necessary to supply a missing limitation, particularly a “key limitation” like the one in question:

In cases in which “common sense” is used to supply a missing limitation, as distinct from a motivation to combine, moreover, our search for a reasoned basis for resort to common sense must be searching. And, this is particularly true where the missing limitation goes to the heart of an invention.

Arendi S.A.R.L. v. Apple, Inc., 832 F.3d 1355, 1362-63 (Fed. Cir. 2016); *see also DSS Tech. Mgm’t v. Apple Inc.*, 885 F.3d 1367, 1374-75 (Fed. Cir. 2018) (rejecting “ordinary creativity” as a basis for overcoming a missing limitation).

Here, Petitioner fails to cite any evidence or provide any explanation of why Grube’s alleged “common bit-loading modulation scheme” would be used ***“for*** communicating between a plurality of nodes” (see Pet., 39-42), much less in a BCN. Petitioner’s argument thus does not even amount to a “common sense” one and thus also fails to demonstrate that its argument as to a limitation lying at the heart of the invention satisfies the “searching” inquiry demanded by *Arendi* and its progeny.

In essence, neither Carhart nor Grube teach the required “determining a common bit-loading modulation scheme ***for communicating*** between a plurality of nodes in” a ***“broadband cable network.”*** Thus, Petitioner fails to demonstrate that

the combination of Carhart-Grube discloses or renders obvious “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in” a “broadband cable network.”

D. Petitioner Fails To Demonstrate A POSITA Would Be Motivated To Combine Carhart And Grube Or Could Do So With A Reasonable Likelihood Of Success.

Even if Grube disclosed “determining a common bit-loading modulation scheme for communicating between a plurality of nodes in” a “broadband cable network (‘BCN’),” Petitioner’s grounds would still fail as Petitioner fails to demonstrate a POSITA would be motivated to combine Carhart and Grube as proposed or could do so with a reasonable likelihood of success.

Petitioner argues that a POSITA would have imported Grube’s citywide, twisted-pair telephone line techniques into Carhart’s coaxial LAN. Pet., 20 (“a POSITA would have applied Grube’s advantageous technique, *as it was used for telephony*, to Carhart’s LAN. *Id.* By employing Grube’s process for establishing control channels and allocating bandwidth for data transmissions between nodes, Carhart’s LAN would receive the reliability and bandwidth improvements that Grube realizes.”), (“a POSITA would have been motivated to employ Carhart’s central computer to send ‘training signals’ as taught by Grube, to the plurality of remote units in the LAN.”); 20-21 (“Using the channel characteristics, Carhart’s

remote units would each generate bit-loading information, and send it, in a bit-loading table, to the central computer, just as Grube's network does.'").

Petitioner, however, fails to prove a POSITA would be motivated to modify Carhart in view of Grube as proposed, or could do so with a reasonable likelihood of success. Carhart is concerned with issues relating to a LAN employing coaxial cable. Grube is fundamentally different and concerns a twisted pair telephonic system on a citywide scale. Petitioner fails to prove that a POSITA would be motivated to combine such disparate references. *See* Section II.D.1. Even if that could be overlooked, Petitioner fails to identify any fashion in which Carhart would benefit from the proposed combination. Indeed, the problems Grube addresses were addressed in coaxial cable years before Carhart. *See* Section II.D.2. Fundamentally, Petitioner's combination is driven only by hindsight. *See* Section II.D.3.

1. A POSITA Would Not Be Motivated To Modify Carhart In View Of Grube In The Ordinary Course Of Research And Development.

Carhart and Grube are directed toward fundamentally different systems with different solutions for different problems specific to the type of connections that are employed in Carhart (coaxial cable in a home network) and Grube (twisted pair telephone lines in a citywide network), respectively. Petitioner, however, fails to demonstrate that a POSITA would have combined such ill-fitting elements of such

disparate references “in the normal course of research and development.” *Unigene Labs., Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1360 (Fed. Cir. 2011). Indeed, many of the reasons why Grube cannot be considered analogous art also apply to the proposed combination of Grube with Carhart—the physical media involved in the two references (*i.e.*, phone line and coaxial cable) are so disparate that a POSITA would not consider one relevant to the other.

As Dr. Russ explains, Carhart is directed towards communications within an in-home coaxial cable network:

Carhart is directed toward “permitting an interface” between “in-home” devices in a local area network using existing in-home coaxial cable. *See, e.g.*, Ex. 1009 [Carhart] Abstract (“A system for permitting an interface between a centralized **in-home** computing apparatus and a plurality of remotely situated **in-home** communications stations is provided.”); 4:43-49 (“Accordingly, it is desirable to provide a cost effective system ... **over existing home coaxial cable wiring** schemes without the employment of costly dedicated and proprietary devices.”); 4:52-57 (“The present invention makes unique use of new and existing **in-home coaxial wiring** systems”). Notably, Carhart distinguishes between its local area network and the “external signal distribution system such as a cable television (CATV) system.” *See id.*, Abstract; 5:13-16 (“The signal path is coupled to an external signal distribution system, for example, a subscriber drop circuit to the subscriber home if the external distribution system is CATV.”). As with the ’759 patent’s

coaxial cable, Carhart's coaxial cable is capable of transmitting over high frequencies with large bandwidths. *Id.*, 1:42-48 ("CATV signals typically use a downstream frequency having a range of from about **50 MHz to about 550 MHz** for broadcast transmission. Recently, many CATV systems have been upgraded to support a higher frequency transmission, for example, up to **860 MHz or 1 GHz.**").

Ex. 2003 [Russ-Decl.] ¶ 85. This, however, stands in sharp distinction to Grube which is directed towards the infrastructure for a citywide, twisted-pair, telephonic system, that operates at far lower frequencies than those present in coaxial cable. *See, e.g.*, Sections II.A, II.B.1, & II.C. Petitioner, fundamentally, gives no convincing account of why a POSITA would be motivated to address issues in Carhart's coaxial cable home LAN via Grube's, citywide, twisted-pair, telephonic system in the normal course of research and development. Ex. 2003 [Russ-Decl.] ¶¶85-87; *id.*, ("A POSITA would not be motivated to improve signaling on coaxial cable via Grube's far more primitive twisted pair system.").

Petitioner's attempts to minimize the differences between Grube's twisted-pair wires and Carhart's coaxial cable fall flat. Petitioner assures us that:

Although Carhart focuses on using coaxial cables rather than other common communication media, e.g., telephone wiring and wireless links, a POSITA would have understood that Grube's method would function in Carhart's cables because switching the link medium does not alter Grube's DMT technique. DISH-1004, ¶98. Indeed, a

POSITA would have applied Grube's advantageous technique, ***as it was used for telephony***, to Carhart's LAN. *Id.*

Pet., 20 (citing Ex. 1004 [Williams-Decl.] ¶ 98); 22 ("Carhart and Grube confront the same problem to be solved: namely, orchestrating data transmission between a central unit and secondary units.").

Petitioner's assertion, however, is conclusory. It only cites Dr. Williams's parroting testimony, but he too does not substantiate his naked assertion that Grube's twisted pair "method would have functioned in Carhart's coaxial cables because switching the link medium does not alter Grube's method." See Ex. 1004 [Williams-Decl.] ¶ 98. It is well-settled that an expert's conclusory statements are insufficient to establish invalidity. See 37 C.F.R. § 42.65(a); *Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886 (Fed. Cir. 2024); *Xerox Corp. v. Bytemark, Inc.*, IPR2022-00624, Paper 9, 15 (Aug. 24, 2022) (precedential).

Moreover, Petitioner and Dr. Williams's arguments that telephone wiring teachings are applicable to a coaxial cable environment are wrong. As 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 Carhart (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 [Signal-Integrity] 94-96, 99-101. Consequently, devices on a local coaxial cable network have a difficult time communicating with each other. Ex. 1009 [Carhart] 4:14-37 (noting problems with coaxial LAN such as “the present isolation capability of splitter devices in existing coaxial wiring schemes ... may prevent... an adequate signal strength from reaching receiving devices of an RF home broad-band system,” “locally transmitted signals of high strength are more likely to interfere with reception of broadcast video services,” and “use of remote cameras... may cause remote camera signals that are transmitted back onto the cable distribution system to interfere with existing cable television services on the cable operator distribution system.”).

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. 1010 [Grube] 4:18-26. Coaxial cable’s higher frequency has no such problem. A POSITA 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.

Ex. 2003 [Russ-Decl.] ¶¶ 92-93.

Moreover, the physical differences between Carhart's coaxial cable and Grube's twisted-pair wiring causes the two systems to operate on different frequencies. As Dr. Russ explains:

... Carhart teaches that its system may operate at “greater than 860 MHz” so as not to interfere with the external cable television system, which operates at 50-550 MHz. Ex. 1009 [Carhart] 11:12-17 (“A signal frequency of greater than 860 MHz may be used with the interface system of the present invention (see FIG. 6) with essentially no spurious emission, and may avoid interference with CATV system signals transmitted along the signal path 23 from the coaxial cable drop 24.”); 9:3-4. By contrast, Grube teaches that its “ADSL system incorporates 256 carrier channels beginning at **25 kilohertz up to 1.1 MHz at so increments of 4 kilohertz.**” Ex. 1010 [Grube] 52:3-6. This difference in frequencies is significant because Carhart's invention relies heavily on a splitter/reflector for filtering and reflecting signals. Ex. 1009 [Carhart] 5:21-45. The splitter/reflector is “frequency selective,” and “prevents a frequency band below f_l from passing between the centralized computing apparatus and communications station to prevent ghosting and interference caused by reflection of signals having a frequency band below f_l .” *Id.*, 5:41-45. Grube's method uses low frequencies, which, if applied in Carhart's system, would be prevented “from passing between the centralized computing apparatus and communication station,” and, thus, render Carhart's

system for communication within the home network completely inoperable.

Ex. 2003 [Russ-Decl.] ¶¶ 110-111.

In view of these significant differences between Carhart and Grube, Petitioner fails to demonstrate that a POSITA would have looked to Grube to modify Carhart.

2. Carhart's Coaxial Cable Network Has No Need For Grube's Telephone System Solutions.

Petitioner additionally fails to prove a POSITA would be motivated to make its combination when its proposed modification of Carhart would provide no discernible benefit to Carhart's system.

Petitioner argues that by employing Grube's alleged technique, "Carhart's LAN would receive the reliability and bandwidth improvements that Grube realizes." Pet., 20; *see also id.*, 17 ("A POSITA would have understood that Carhart's LAN requires high bandwidth, particularly if each remote device uses the network simultaneously."). But, Petitioner overlooks that Grube must solve the issue of limited bandwidth and reliability because of twisted-pair telephone line's limited bandwidth. *See* Section II.B.1; Ex. 2003 [Russ-Decl.] ¶¶ 94-96. Through these mechanisms, Grube is able to increase its bandwidth to 1.1 MHz. Ex. 1010 [Grube] 3:20-22. But that is a trivial amount of bandwidth in the context of

Carhart’s coaxial cable, which has, comparatively, unlimited bandwidth, and thus is not concerned with improving bandwidth or reliability, especially in the way Grube does by minimizing resource usage. *Id.* Indeed, significantly, Carhart teaches that its “interface system 20 is further designed to **utilize the excess unused bandwidth** on the in-home coaxial cables.” Ex. 1009 [Carhart] 8:36-38. Thus, Carhart teaches that it is unconcerned with a potential lack of bandwidth, and consequently, Carhart has no need for Grube’s alleged technique to “overcom[e]” an issue Carhart does not have. It is not obvious to modify a reference that already achieves the benefit supposedly served by the proposed modification. *See, e.g., In re NTP, Inc.*, 654 F.3d 1279, 1289 (Fed. Cir. 2011); *Apple Inc. v. Cellular Comm’ns Equipment, LLC*, IPR2015-00576, Paper 7, 12 (June 12, 2015); *F5 Networks, Inc. v. Radware, Ltd.*, IPR2017-00124, Paper 48, 64-65 (Apr. 23, 2018) (no motivation for modification that “serve[s] no purpose”). Carhart not only achieves this aspect of Grube, it does so far better just by virtue of utilizing a coaxial cable system.

Moreover, Petitioner fails to demonstrate that Grube’s method of achieving “reliability” would also result in increased reliability in Carhart’s system. As previously explained, twisted-pair telephone lines and coaxial cable both face different issues with transmission due to their physical differences. *See* Sections II.A, II.B.1; Ex. 2003 [Russ-Decl.] ¶¶ 97-98. Twisted-pair lines are unshielded,

and thus have limited bandwidth. *Id.* Thus, Grube’s issues with reliability—and techniques to deal with those issues—stem from the need to manage limited bandwidth between a city’s worth of ongoing and potentially incoming calls. *Id.* By contrast, coaxial cable is shielded and thus has vastly wider bandwidth. *See* Sections II.A, II.B.1; Ex. 2003 [Russ-Decl.] ¶¶ 98-99. The higher frequency transmissions and shorter wavelengths result in negative transmission line effects, such as reflections. *Id.*; *see also* Ex. 1009 [Carhart] 4:14-19 (noting “ghosting caused by signal reflections.”). In-home coaxial cable networks also utilize splitters, which cause isolation between in-home devices. *See* Sections II.A, II.B.1; Ex. 2003 [Russ-Decl.] ¶ 99; Ex. 1009 [Carhart] 4:20-26 (“the present isolation capability of splitter devices in existing coaxial wiring schemes... may prevent... an adequate signal strength from reaching receiving devices”). There is no indication that Grube’s techniques to improve reliability in light of limited bandwidth by minimizing resources dedicated to each call would apply to Carhart’s problems with reflections and isolation. Ex. 2003 [Russ-Decl.] ¶¶ 99-100.

Petitioner further fails to substantiate its assertion that “Grube represents a suitable, known technique for orchestrating digital communication between a central unit and multiple remote units in networks like Carhart’s.” Pet., 16. Grube’s citywide network, however, is not in fact like Carhart’s LAN. This alone

is enough to discredit Petitioner’s assertion. Moreover, Carhart’s “external CATV cable system”—which is the only network in Carhart that is “like” Grube’s—had already solved the issues Grube seeks to address between the headend to premises long before:

Grube’s improvements are to add “one-to-many and/or many-to-one” broadcast from a headend (the primary site) to secondary sites (*e.g.*, buildings) to its ADSL system. Ex. 1010 [Grube] 4:18-26. But external cable networks—the only network in Carhart I see that has any resemblance to Grube’s—have been broadcasting between the headend and buildings since the 1960’s. Ex. 2008 [Cable-History-Timeline] 7. In other words, these are problems that were solved literally decades earlier.

In essence, Petitioner appears to argue that a POSITA would be motivated to add Grube’s citywide, telephonic “technique for orchestrating digital communication between a central unit and multiple remote units” to Carhart (which applies to coaxial in-home network). Even if this were correct, which it is not for the reasons I explained above, a POSITA would not turn to Grube which provides broadcasting functionality (1) ***outside the home***, (2) ***over twisted pair***, (3) ***for an ADSL system***. There is no other reason to make this combination other than to reconstruct the claims of the ’759 patent with the benefit of hindsight.

Ex. 2003 [Russ-Decl.] ¶¶ 101-102.

Thus, Petitioner fails to demonstrate that a POSITA would have combined Carhart and Grube as proposed when the proffered benefits of the combination are either already present in or irrelevant to Carhart's system.

3. Petitioner's Proposed Combination Is Based Upon Impermissible Hindsight.

In the end, Petitioner has proposed combining two fundamentally different systems for no reason other than to try and match the claims. It is well-settled that obviousness is not established merely because the "elements of the claimed invention were independently known in the prior art." *Metalcraft of Mayville, Inc. v. Toro Co.*, 848 F.3d 1358, 1367 (Fed. Cir. 2017); *see also Virtek Vision Int'l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 886 (Fed. Cir. 2024) ("It does not suffice to meet the motivation to combine requirement to recognize that two alternative arrangements ... were both known in the art."). Rather, an *ex post facto* obviousness assessment that "break[s] an invention into its component parts, then find[s] a prior art reference corresponding to each component" "would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components" and "would discount the value of combining various existing features or principles in a new way to achieve a new result—often the essence of the invention." *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005); *see also Ruiz v. A.B. Chance Co.*, 357

F.3d 1270, 1275 (Fed. Cir. 2004) (“This form of hindsight reasoning, using the invention as a roadmap to find its prior art components, would discount the value of combining various existing features or principles in a new way to achieve a new result - often the very definition of invention”).

Critically, what is required, and what Petitioner fails to provide, is proof that “one of skill in the art would have combined these particular references to produce the claimed invention.” *Metalcraft*, 848 F.3d at 1367. Where, as here, Petitioner fails to provide that proof, “we are left with only hindsight bias that *KSR* warns against.” *Id.* Petitioner’s combination of two disparate, incompatible systems is precisely the sort of conclusory, hindsight-driven analysis that the law forbids.

Unsurprisingly, Petitioner’s hindsight-driven proffered motivations fail. Petitioner argues that a POSITA would have been motivated to combine Carhart and Grube because Grube’s techniques were “known.” Pet., 22. But, as the Federal Circuit has recently held, “it does not suffice to simply be known. A reason for combining must exist.” *Virtek Vision Int’l ULC v. Assembly Guidance Sys., Inc.*, 97 F.4th 882, 888 (Fed. Cir. 2024).

Thus, Petitioner fails to demonstrate that a POSITA would have been motivated or able to combine Carhart and Grube as proposed with a reasonable likelihood of success.

III. CONCLUSION

Thus, Petitioner fails to demonstrate a reasonable likelihood of success as to any of the challenged claims, and the Petition should be denied.

Respectfully submitted,

/ Kenneth J. Weatherwax /

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Date: May 28, 2024

CERTIFICATE OF COMPLIANCE WITH TYPE-VOLUME LIMITS

This Patent Owner Preliminary Response (the “POPR”) consists of 9,163 words, excluding table of contents, table of authorities, certificate of service, this certificate, or table of exhibits. The POPR complies with the type-volume limitation of 14,000 words as mandated in 37 C.F.R. § 42.24. In preparing this certificate, counsel has relied on the word count of the word-processing system used to prepare the paper (Microsoft Word).

Respectfully submitted,

/ Colette Woo /

Date: May 28, 2024

CERTIFICATE OF SERVICE

The undersigned hereby certifies that the following documents were served
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