

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: IPR2024-00393

U.S. PATENT NO. 7,295,518

PATENT OWNER'S PRELIMINARY RESPONSE

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TABLE OF PATENT OWNER’S EXHIBITS

Exhibit No.	Description
Ex. 2001	U.S. Patent No. 6,438,174 to Isaksson et al. (“ <i>Isaksson IP</i> ”)

I. INTRODUCTION

Patent Owner, Entropic Communications, LLC (“Entropic” or “Patent Owner”), submits this Patent Owner Preliminary Response pursuant to 37 C.F.R. § 42.107(a) to the *Inter Partes* Review petition (“Petition”) filed by DISH Network L.L.C., Dish Network Service L.L.C., DISH Network Corporation, and Dish Network California Service Corporation (collectively, “Petitioner”) for claims 1 and 3 (the “Challenged Claims”) of U.S. Patent 7,295,518 (the “’518 Patent”).

The ’518 Patent provides a novel on-premises network implemented over existing coaxial cables. Ex. 1001, Abstract, 4:19-33. The ’518 Patent’s data communication network addresses impediments that previously restricted high bandwidth communication between terminal devices. *Id.* To distribute downstream signals, an on-premises network includes coaxial cabling and splitters; splitters receive signals at an input port and transmit signals, albeit at a slightly reduced power, via tap ports. *Id.*, 1:40-45, 1:53-65, Fig. 1. A splitter’s tap ports, however, are isolated from each other, causing signal loss when terminal devices communicate with each other through the tap ports (which is required in an on-premises local network). *Id.*, 2:27-34. Further, these splitters may have imperfect connection points, creating micro reflections, which can produce multipath signals. *Id.*, 3:5-10. This multipath environment can impair the ability to achieve high data rates in the on-premises network. *Id.*, 4:19-26.

While prior art solutions address communicating between on-premises units and a cable head end or central office (*i.e.*, data communication ***outside*** a network in a home or building), these solutions fail to address the impairments present in the on-premises wiring that restrict high bandwidth communication between terminal devices in a broadband local area data network using coaxial cable wiring. *Id.*, 4:19-33; *id.*, Abstract. The '518 Patent's optimized data communication network provides for high bandwidth terminal device communication in a broadband local area data network using the coaxial cable wiring within the premise. *Id.*, 4:19-33. To accomplish this, the '518 Patent's network devices (*i.e.*, terminal devices) transmit and analyze channel probe messages to determine channel characteristics and select bit loading for intra-terminal device communication. *Id.*, cl. 1.

Specifically, the data communication network provided by the '518 Patent applies to ***on-premises networking*** over coaxial cabling using multi-carrier signaling. *Id.*, Abstract. The '518 Patent explains that prior art solutions address communications between on-premises units and a cable head end—***not within the premises***. *Id.*, 4:19:33; *see id.* 3:25-4:33 (detailing the prior art with over a dozen issued patents). The Petition and its references reflect the '518 Patent's description of the prior art. In both grounds, the Petition uses a base reference to teach on-premises networks that lack key attributes of the Challenged Claims, including the probe messaging for adaptive bit loading that distinguished the claims from the art

during prosecution. Then, relying solely on hindsight bias to reconstruct the novel features of the '518 Patent, the Petition adds a secondary reference related to wide-area networks that use different transmission mediums for different purposes, ultimately providing a non-obvious combination.

The Petition proposes two theories of unpatentability, and both fail.

First, in Ground 1, the Petition relies on *Kliger* (Ex. 1007). *Kliger* identifies, *and solves*, a signal attenuation problem with then-existing networks. *Kliger* explains how, in its system, signal attenuation is managed through adjustments to the power level of the transmitted signal from the home network module (“HNM”) to the demarcation point unit (“DPU”).

The '518 Patent discloses that there are different ways to manage signal attenuation: “Bit loading, along with power loading, adaptive power control, and frequency coordination can be used individually or in combination to implement a network that overcomes the problem of multipath and high attenuation in building cable wiring that would restrict the ability of terminal devices to communicate with each other.” Ex. 1001, 4:42-47. The '518 Patent notably claims one of these, the use of bit loading; *Kliger* relies on an entirely different solution: adaptive power control.

To communicate, *Kliger's* HNMs transmit signals upstream, over the backbone, to the DPU. Ex. 1007, ¶ [0055]. Each HNM adjusts the power of its

network signals to ensure that the DPU receives all signals at a predefined power level, which then supplies its own constant amplification to the signal that is then passed to the receiving HNM. *Id.*, ¶ [0057]. The HNMs implement adaptive power control “to account for the attenuation of the signal over the backbone 20.” *Id.*

The Petition masks the clear differences between *Kliger’s* HNMs and the terminal devices of the ’518 Patent to avoid the intricacies of the claimed technology. This obfuscation underscores the gaps in the Petition’s analysis; the ’518 Patent simply is directed to a different technology. The shortcomings of the prior art also show that the Petition is replete with hindsight bias and is based on what the ’518 Patent already identifies, proposes, and solves.

Second, in Ground 2, the Petition relies on inconsistent modulation schemes. Specifically, *Amit* relies on a single carrier frequency for its in-home network communication. Ex. 1014, 4:11-14 (“[T]he headend assigns ***the*** carrier frequency and bandwidth to each home network.”).¹ The Petition relies on incompatible references, alleging, only through the benefit of hindsight and using the ’518 Patent as a roadmap, that three discrete references would be combined, in the face of the actual teachings of those references. The proposed combination also adds undue

¹ All emphasis herein is added unless stated otherwise.

complexity, and the Petition fails to acknowledge, let alone address, these complexities.

As such, the Petition does not have a reasonable likelihood of prevailing on either Ground. The Petition fails to establish a motivation to combine *Kliger*² and *Isaksson*³ or to combine *Amit*,⁴ *Jacobsen*,⁵ and *Isaksson* to arrive at claim 1. Both Grounds fail to render obvious claim 1. And because claim 3 depends from independent claim 1, the entirety of each Ground should be rejected.

II. SUMMARY OF THE '518 PATENT

The '518 Patent provides a broadband local area network using existing coaxial cable wiring for device communication. Ex. 1001, Abstract. To optimize such communication, the network uses probe messages from one terminal device to another to characterize communication channels to determine optimum multi-carrier

² U.S. Patent App. Pub. No. 2002/0069417 to Kliger et al. (Ex. 1007).

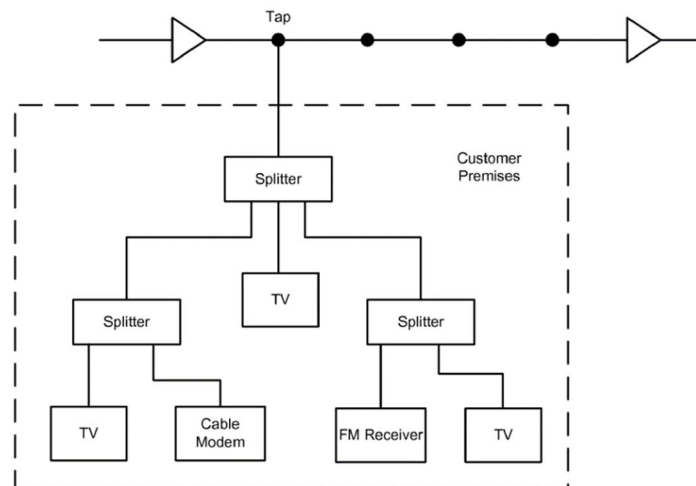
³ Int'l Pub. No. WO 1998/010545 to Isaksson et al. (Ex. 1013).

⁴ U.S. Patent No. 7,127,734 to Amit et al. (Ex. 1014).

⁵ Jacobsen et al., An Efficient Digital Modulation Scheme for Multimedia Transmission on the Cable Television Network, 43rd Annual National Cable Television Association Convention and Exposition, New Orleans, LA. 1994 (Ex. 1016).

bit loading for each channel in the on-premises broadband coaxial local area data network. *Id.*

Figure 1 illustrates a traditional on-premises coaxial signal distribution plan, including signal splitters and network devices (*i.e.*, customer premise equipment). *Id.*, 5:10-11. Signal splitters distribute downstream signals from the point-of-entry to various network devices. *Id.*, 1:40-45. For example, a signal splitter (“splitter”) receives a signal at the input port (*e.g.*, a common port) and splits the power equally between two output ports (*e.g.*, tap ports⁶). *Id.*, 1:53-56, 61-65, Fig. 1.



Ex. 1001, Fig. 1.

⁶ As referenced herein, tap ports are part of a splitter. Figure 1 denotes a “tap” in the cable plant, which is not to be confused with a “tap port” of a splitter.

A splitter may alternatively include a power-dividing ratio to divide the signal unequally between the two tap ports. *Id.*, 2:17-27. Such splitters can balance signal power between terminal devices when the coaxial cable wiring includes multiple levels of splitters. *Id.*, 2:20-27. Typically, splitters are bi-directional, and thus can function as signal combiners. *Id.*, 2:5-10. When combining signals, the tap ports become input ports and the common port becomes an output port. *Id.* As a signal combiner, the splitter provides a return path for terminal devices, such as cable modems, to transmit signals back to the cable head end. *Id.*, 2:11-16. Although splitters provide needed functions, prior art cable TV wiring configurations present obstacles for device-to-device communication. *Id.*, 2:28-34, 2:35-48, 4:19-32.

First, a splitter's tap ports are isolated. *Id.*, 2:27-34. Inter-port isolation leads to signal attenuation when terminal devices communicate through the tap ports. *Id.* In a conventional cable TV configuration, inter-port isolation is desirable because terminal devices did not communicate with each other (and instead only receive and transmit signals from/to the head end). *Id.*, 2:28-38. Thus, most on-premises splitters have this isolation. In the described and claimed LAN systems, however, terminal devices are required to communicate with each other, and the signal loss caused by inter-port isolation becomes an undesirable byproduct of the existing design. *Id.*, 2:35-41.

Second, signal attenuation in the on-premises broadband coaxial network is variable across the different paths. *Id.*, 2:41-48. The signal path between each terminal device is unique, which results in varying levels of loss between each terminal device through a varied number of splitters/combiners, various connected and nearby devices, and channel length. *Id.* This signal loss could be overcome by replacing the main splitter at a building point-of-entry with a symmetric splitter/combiner. *Id.* 2:54-56. However, a bi-directional power amplifier would have to be installed to boost the signal, and power (which is generally not available at the main splitter) would have to be provided to the amplifier. *See id.*, 2:54-3:4.

Third, imperfect connection points create micro reflections, which may combine with the dominant main signal to produce a multipath signal. *Id.*, 3:5-10. Multipath signals may be undesirable because they create inter-symbol interference (“ISI”). *Id.*, 3:7-10. ISI degrades the bit error rate (“BER”) performance of the communication channel and impairs the ability to achieve high data rates in a communication network. *Id.*, 3:15-16, 4:23-25.

The ’518 Patent, recognizing the above impediments to on-premises broadband networks over coaxial cable, provides an innovative approach to communication networks to solve the above impairments that restrict on-premises intra-terminal device communications. *Id.*, 4:36-47. To transmit data signals through existing coaxial cabling and address the shortcomings of the prior art, the

'518 Patent uses variable multi-carrier modulation. *Id.*, 4:36-40. To provide this variable multi-carrier modulation, the '518 Patent optimizes the network using probe messages to gather information regarding the channels (signal paths). *Id.*, 4:48-62. This gathered information (channel characteristics) is then used to select the bit loading scheme applied to the multi-carrier modulation. *Id.*

The '518 Patent explains these channel probe messages are formed using a predetermined bit sequence and length. *Id.*, 4:48-52. The channel probe messages are then transmitted between terminal devices to estimate channel characteristics, which include (1) multipath characteristics and (2) the signal-to-noise ("SNR") profile over the frequency band of interest. *Id.* The receiving device analyzes the channel probe message to determine the channel impairment at each carrier frequency. *Id.*, 4:57-59. Based on this channel estimation, bit loading is adjusted to increase or decrease the modulation order corresponding to SNR. *Id.*, 4:59-62.

III. ORIGINAL PROSECUTION OF THE '518 PATENT

On December 18, 2002, the '518 Patent was filed as U.S. Patent Application No. 10/322,834. Ex. 1002. The United States Patent and Trademark Office ("Patent Office") issued a restriction requirement against the 10 originally filed claims. *Id.*, 15-20. The Applicant elected claims 1 to 4 and 10 and canceled claims 5 to 9. *Id.*, 9-12. Following the election, Applicant conducted an Examiner Interview and agreed to incorporate the subject matter of claim 2 into independent claim 1, which

was allowed. *Id.*, 8. In the Notice of Allowance, the Examiner stated that the prior art fails to disclose: “a network device for communicating data to other network devices by utilizing unique method step of determining channel characteristics and a bit loading profile used to transmit data by analyzing received probe message signals.” *Id.* at 6.

Notably, the Examiner cited two prior art references in the Notice of Allowance. *Id.* (citing U.S. Patent No. 6,886,181 and “*Multicarrier Modulation for Data Transmission; An Idea Whose Time has Come*,” by John A.C. Bingham). The first reference identified in the Notice of Allowance discloses components of an on-premises network while the second reference relates to multi-carrier modulation and bit loading. With its combinations, the Petition simply re-presents this same theory. The Petition uses a base reference for on-premises networks and, relying on hindsight bias, adds a secondary reference having an incompatible wide-area network to teach the novel features of the Challenged Claims. The prior art relied upon in the Petition therefore fails to disturb the findings of the Patent Office.

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

The Petition attempts to combine references with fundamentally different architectures in each of its Grounds 1 and 2. In Ground 1, the Petition proposes the combination of *Kliger* and *Isaksson*. *Kliger* describes interface devices that are

implemented within home coaxial systems for communicating signals between end consumer-facing devices and the network backbone. *Isaksson*, by contrast, concerns data transmission that ***does not traverse the tap ports of coaxial splitters***, but instead occurs over ***twisted pair cables*** for a distribution network ***outside of the home***.

The proposed combination fails on numerous grounds. First, *Kliger* already identified and solved the problem that the Petition uses to justify its proposed combination, albeit through adaptive power loading—a solution distinct from the claimed solution of the '518 Patent. Second, the proposed combination would fundamentally disrupt the operation of *Kliger* by substituting its fixed constellation sizes with variable constellation sizes. Third, the Petition disregards the functions in *Kliger* regarding channel estimation and then uses hindsight to extract the channel estimation process from the *Isaksson* reference, without any explanation for why a POSITA would have disregarded the existing functions in *Kliger* or how the functions in *Kliger* could or would be modified.

In Ground 2, the Petition proposes the combination of *Amit*, *Jacobsen*, and *Isaksson*. *Amit* provides a home network over coaxial cables with interface devices. These devices use single carrier modulation to facilitate end device communication. *Jacobsen* and *Isaksson* (Ground 2's secondary and tertiary references), in contrast, concern data transmission that ***does not traverse the tap ports of coaxial splitters***, but instead occurs over ***twisted pair cables*** for a distribution network ***outside of the***

home. The proposed combination in Ground 2 also fails. *Amit* and *Jacobsen* are fundamentally incompatible because *Amit* seeks to **increase** reflection for purposes of on-premises networking, whereas *Jacobsen* teaches that reflection is **undesirable** because it impedes communication outside of the home. The Petition never addresses this critical inconsistency. Further, the Petition fails to explain why a POSITA would have modified *Amit* to use multi-carrier modulation given that *Amit* employs different modulation schemes to achieve a fundamentally different network that does not rely on such modulation.

These differences render the proposed combinations non-obvious and defeat any motivation to combine the teachings of the references as proposed in the Petition. Further, both the Petition and Dr. Williams's analysis are infected by hindsight bias. This is evident from Dr. Williams's analysis, which overlooks the complexity of combining communication techniques used in drastically different architectures over different communication mediums (*i.e.*, twisted pair versus coaxial cables) for different purposes (*i.e.*, on-premises communication versus wide-area networking). It is also evident from the fact that both the Petition and Dr. Williams neglect material functionality of the base references. For instance, *Kliger* uses registration and self-train bursts to measure network conditions and modify device operation in response. But neither the Petition nor Dr. Williams references these bursts a single time. Instead, each pretends that *Kliger* lacks such functionality

and then renders that functionality superfluous by pulling in teachings from a secondary reference using the claimed invention of the '518 Patent as a roadmap. Such hindsight-driven analysis is improper. *See, e.g., In re NTP, Inc.*, 654 F.3d 1279, 1289 (Fed. Cir. 2011) (reversing IPR obviousness rejections as “based on improper hindsight reasoning” when “the [prior art] already discloses an RF network that connects portable computers to the system. Thus, adding an RF network [in the way necessary to meet the claims] would render the RF network [in the prior art] superfluous.”); *Apple Inc. v. Cellular Comm’ns Equipment, LLC*, IPR2015-00576, Paper 7 at 12 (June 12, 2015) (denying institution where “Petitioner ... fails to provide a specific explanation why [the primary reference] did not already accomplish [the asserted benefits] by itself.”).

Dr. Williams and the Petition fail to establish that a POSITA would be motivated to combine the prior art references to arrive at the claims, and the Petition should be denied.

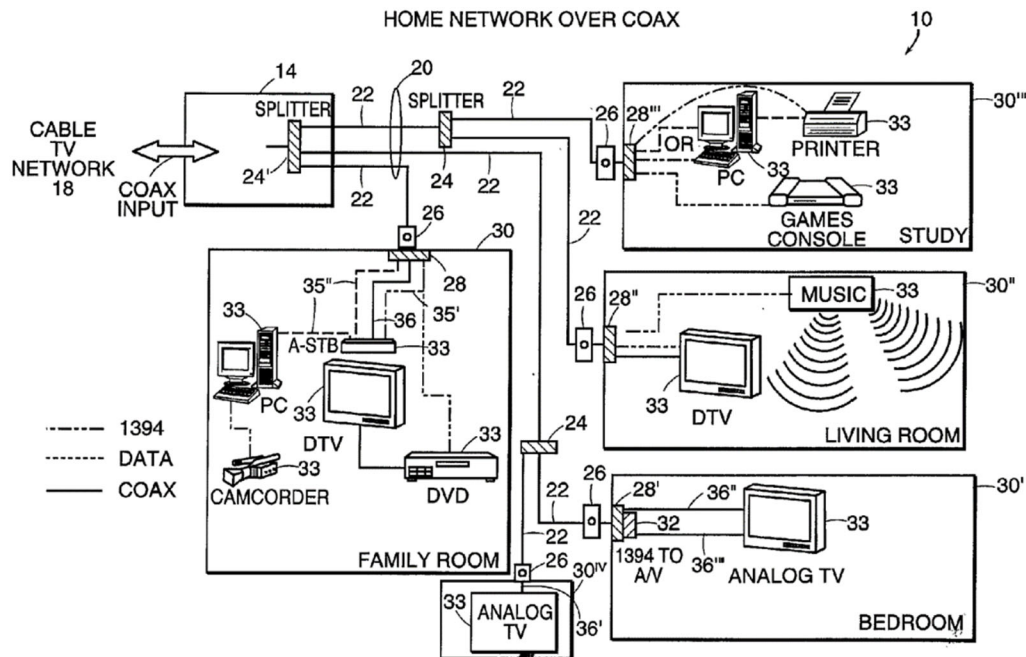
A. Ground 1 Fails to Render Obvious the Challenged Claims

The combination of *Kliger* and *Isaksson* fails to render obvious the Challenged Claims. Petition, 23-41. “An obviousness determination generally requires [1] a finding that all claimed limitations are disclosed in the prior art, and [2] that a person of ordinary skill in the art would have been motivated to combine or modify the teachings in the prior art.” *Univ. of Strathclyde v. Clear-Vu Lighting*

LLC, 17 F.4th 155, 160 (Fed. Cir. 2021) (citations omitted). Ground 1 fails to satisfy these two requirements because the Petition fails to provide a sufficient motivation to combine *Kliger* and *Isaksson*.

1. Overview of *Kliger*

Unlike the '518 Patent's network, where terminal devices communicate directly, *Kliger*'s home network uses HNMs to facilitate communication between end devices. Ex. 1007, Abstract. Figure 1 illustrates *Kliger*'s home network, including a DPU (14), HNMs (28), and the end devices (33). *Id.*, ¶¶ [0041]-[0044], Fig. 1 (reproduced below). The DPU "operates as the interface between the home network 10 and an external network 18." *Id.*, ¶ [0041]. An HNM, which connects to the network backbone through TV outlets 26, operates as an interface between the multiple end devices 33 in a given room and the DPU 14. *Id.*, ¶¶ [0041]-[0043]. In other words, there is one HNM per room regardless of the number of end devices 33 in the room. *Id.* The HNM is **required** for communications between end devices. *Id.*, ¶¶ [0044]-[0045], [0049]. Thus, in rooms without an HNM coupled to the network backbone (*e.g.*, 30^{iv}), the end devices cannot communicate and instead connect directly to the external network. *Id.*, ¶ [0049].



Ex. 1007, Fig. 1.

To communicate, *Kliger's* HNMs 28 transmit signals upstream, over the backbone 20, to the home-network reflector unit ("HRU") (not depicted in Fig. 1, identified as 44 in Fig. 2). *Id.*, ¶ [0055]. The HRU, which is one component of the DPU (14 in Fig. 1), receives the upstream signal, amplifies the signal power and shifts the RF frequency, and then returns the signal to the backbone 20 as a downstream signal, which is then received by an HNM. *Id.*, ¶ [0056].

As part of this amplification, *Kliger's* HNMs employ transmission power control. *Id.*, ¶ [0057]. Each HNM adjusts the initial transmission power of its network signals to ensure that the HRU receives all signals at a predefined power level. *Id.* As a result, the HRU receives all upstream signals at a consistent power "because each HNM 28 uses an appropriate transmission power level to account for

the attenuation of the signal over the backbone 20.” *Id.* Unlike *Kliger’s* network, the Challenged Claims address signal attenuation through bit loading.

Because the HRU 44 performs constant amplification on all signals, the downstream signal power of signals leaving the HRU 44 is also constant. *Id.* With this functionality, *Kliger* addresses potential issues with adding or removing HNMs from its network, rendering the “base sync frames” of *Isaksson* duplicative to the operation already being performed in *Kliger*. *See* Section IV.A.4.a; *see also* Petition, 23-24 (relying on the dynamic conditions of *Kliger* as motivation to insert *Isaksson’s* multi-carrier signaling in *Kliger’s* HNMs).

Kliger’s end devices produce and send packets to the HNM of the room, which prepares the packets into a burst for transmission over the backbone. *Id.*, ¶ [0085]. The MAC protocol used in *Kliger* supports a variety of bursts, including registration bursts to register an HNM with the home network. *Id.*, ¶¶ [0086], [0090]. Using a registration burst, an HNM can request a guaranteed bandwidth and indicate the amount of bandwidth required. *Id.* An HNM can also use a registration burst to adapt to the Phy parameters of the home network. *Id.*, ¶¶ [0089], [0108].

Figure 6 illustrates the structure of a burst transmitted over the backbone. *Id.*, ¶ [0091], Fig. 6. Each burst includes data that has a ***fixed constellation size***. *Id.*, ¶ [0099]; *see id.*, Fig. 1. For example, registration bursts use QPSK, which is the default constellation size for new HNMs joining the network. *Id.*, ¶ [0099].

Conversely, the Challenged Claims use bit loading (*i.e.*, adjusting the order of constellation based on SNR) to address signal attenuation. Ex. 1001, 8:9-12. Fundamentally, bit loading cannot be implemented when data is transmitted using a fixed constellation size as *Kliger* provides. The Petition ignores this disclosure in its analysis.

The MAC bursts of *Kliger* render the proffered combination with *Isaksson* duplicative. See Petition, 23-24 (“The dynamic nature of the network conditions [of *Kliger*] means that the carriers used in the multi-carrier signaling are subject to variable conditions.”). With *Kliger*’s MAC protocol, the HNMs already request a guaranteed bandwidth and indicate the amount of bandwidth required when registering to the network. Ex. 1007, ¶¶ [0089], [0090], [0108]. This teaching of *Kliger* obviates the need to include the “base sync frames” of *Isaksson*, which are transmitted over a different medium, in a different frequency band, for mere point-to-point communications.

2. Overview of *Isaksson*

In contrast to *Kliger*’s home network, *Isaksson* discloses a multi-carrier system for the installed copper network “intended for the transmission of a high (26 Mbps) bit-rate signal *downstream to the subscriber* and a low (2 Mbps) bit-rate

signal upstream, from the subscriber.” Ex. 1013, 24:8-28.⁷ The “need to transmit high bit rate traffic over copper pairs” led to the development of various transmission schemes, including Asymmetric Digital Subscriber Line (“ADSL”) and Very High Bitrate Digital Subscriber Line (“VDSL”). *Id.*, 1:8-18.

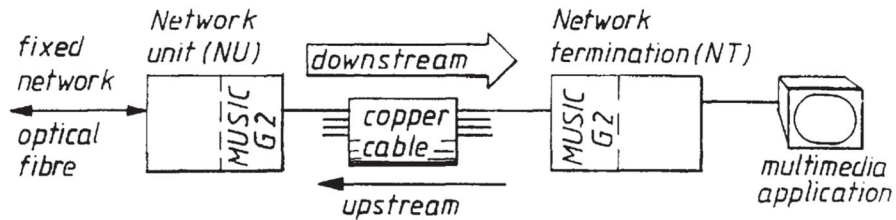
Typically, DSL transmission schemes use a multi-carrier modulation technique known as discrete multi-tone modulation (“DMT”). *Id.* DMT divides the available bandwidth into sub-channels and allocates traffic into sub-channels depending on the noise power and transmission loss of each sub-channel. *Id.*, 1:19-26. DMT can also use bit loading techniques to assign different modulation sizes to each sub-channel based on the signal-to-noise ratio. *Id.*, 3:24-34. *Isaksson*’s bit loading techniques affect the total bandwidth of the system in real time. *Id.* “This variation in bandwidth leads to an ***absolute system requirement*** for ***synchronous configuration of the transmitter and the receiver***, in terms of the number of coded/decoded bits per symbol and carrier wave. If this requirement is not met, the system will be unable to maintain a connection.” *Id.*, 3:29-34.

⁷ Like the Petition, the Patent Owner’s citations to *Isaksson* (Ex. 1013) rely on the original page numbers that appear at the top of each page rather than the stamped page numbers applied by Petitioner.

To achieve this requirement, *Isaksson* provides “a multi-carrier modulated system with bit-loading capacity, by dynamically changing the number of coded/decoded bits per carrier wave.” *Id.*, 4:1-20. “[A] particular algorithm[] ensures the synchronism of the system during configuration changes” to address the “absolute system requirement for synchronous configuration of the transmitter and the receiver.” *Id.*, 4:19-20, 3:29-31. To do so, *Isaksson* uses a “base sync frame” with predetermined content to measure the characteristics of the channel. *Id.*, 16:8-12. A transceiver receives the “base sync frame,” which is then compared to a reference frame to estimate channel characteristics. *Id.*, 10:10-14.

Importantly, *Isaksson*’s architecture does not include splitters and thus does not disclose network devices that communicate across the tap ports of a splitter in an on-premises network. With this architecture, *Isaksson*’s network does not address any potential issues caused by communicating over a splitter (*e.g.*, signal attenuation or reflections). Moreover, *Isaksson*’s absolute requirement of connected channels requires an agreement across the point-to-point connection between the transmitting node and receiving node. *Isaksson* also implements its system over an installed copper line for data distribution outside of the home. *Id.*, 24:8-28. *Isaksson* does not provide any teachings of an on-premises coaxial network. *Isaksson*’s system is instead designed for point-to-point communication over copper pair from a

transceiver (NU) to a receiver (NT). *Id.*; *id.*, Fig. 1 (reproduced below). *Isaksson*’s architecture is fundamentally different from the hardware of *Kliger*.



Ex. 1013, Fig. 1.

3. *Isaksson* is Cumulative of *Isaksson II*

Isaksson also is “substantially the same art previously presented to the Office.” *Advanced Bionics, LLC v. Med-El Electromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 7 (PTAB Feb.13, 2020) (precedential). The ’518 Patent incorporates *Isaksson II* by reference, “which shares a priority date, inventorship, and some description with *Isaksson*.” Petition, 87 (citing Ex. 1001, 8:19-23). With this incorporation by reference, *Isaksson* was previously presented to the Office.

The Petition cites several cases, arguing that *Isaksson II* was not presented to the Patent Office. *See* Petition, 87. The Petition’s cases, however, are easily distinguishable as each are relevant to a reference that is cited in an IDS—not a reference expressly incorporated into the specification (as *Isaksson II* is here). *See, e.g., Advanced Display Sys., Inc. v. Kent State Univ.*, 212 F.3d 1271, 1282 (Fed. Cir. 2000) (“Incorporation by reference provides a method for integrating material from various documents into a host document—a patent or printed publication in an

anticipation determination—by citing such material in a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein.”); *Samsung Electronics Co., Ltd., v. Dodots Licensing Solutions LLC*, IPR2023-00756, Paper 9 at 58 (PTAB Oct. 11, 2023) (“Patents that are incorporated by reference are ‘effectively part of the host [patents] as if [they] were explicitly contained therein.’” (citing *X2Y Attenuators, LLC v. U.S. Int’l Trade Comm’n*, 757 F.3d 1358, 1362-63 (Fed. Cir. 2014))). Accordingly, the two cases relied on by the Petition are inapposite to the situation at hand as *Isaksson II* was expressly presented to the Patent Office, not hidden in an IDS.

Further, the Petition fails to provide any substantive argument regarding the differences between *Isaksson* and *Isaksson II*. Despite over sixty citations to *Isaksson*, the Petition does not specify which matter is new matter in *Isaksson* that is not presented in *Isaksson II*. See generally Petition. The Petition relies on *Isaksson* to allegedly teach limitations [1d.i] and [1d.ii]. See Petition, 36-41. Similar to *Isaksson*, *Isaksson II* discloses a “multi-carrier transmission system.” Ex. 1001, Abstract; see Petition, 37. This system provides a method for “determining a constellation (bit-loading) for each single carrier, characterised by the steps of determining a parameter for each single carrier.” Ex. 2001, 3:3-16; see Petition, 37-41. The Petition relies on the same system, as disclosed in *Isaksson*, when addressing the Challenged Claims. Petition, 37-41.

The '518 Patent's incorporation of *Isaksson II* reinforces the Petition's reliance on hindsight bias. The '518 Patent details existing art, identifies the shortcomings, and provides a solution above what the disclosure of that prior art teaches. The state of the art "address[ed] communicating between a cable head end and in-home units ***but do not address*** the impairments present in the home wiring." Ex. 1001, 4:27–33; 8:18-26 (*Isaksson II* "discloses discrete multi-tone modulation and a technique for bit loading applied to point-to-point twisted pair wiring.").

The Petition then relies on nothing more than hindsight bias with the '518 Patent as the roadmap as it presents its challenge to the claims of the '518 Patent. The Petition uses prior art references related to data communications outside the home (like the art distinguished in the '518 Patent) to solve issues identified and addressed by the '518 Patent. Absent hindsight bias, a POSITA would not arrive at the Challenged Claims. *Polaris Industries, Inc. v. Arctic Cat, Inc.*, 391 F.3d 1195, 1068-69 (Fed. Cir. 2004) ("We have observed that 'the prejudice of hindsight bias' often overlooks that the 'genius of invention is often a combination of known elements which in hindsight seems preordained.'" (citing *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.*, 711 F.3d 1348, 1368 (Fed. Cir. 2013))). Indeed, the Petition appears to rely on the exact same sequence of prior art that the '518 Patent describes in its own background, underscoring the hindsight bias that infects the Petition's analysis.

4. The Petitioner Fails to Show Motivation to Combine *Kliger* and *Isaksson*

- a. *Kliger* Already Identifies and Solves Alleged “Challenges” that the Petition Relies on for a Motivation to Combine *Kliger* and *Isaksson*

According to the Petition, “a POSITA would have been motivated to improve *Kliger*’s multi-carrier signaling using *Isaksson*” because *Kliger* includes various “challenges.” Petition, 23, 24 (citing Ex. 1004, ¶ [0068]). The Petition’s argument fails because *Kliger* already solves each “challenge” that allegedly exists. *See, e.g., Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d. 1342, 1369 (Fed. Cir. 2012) (“[B]oth of these references independently accomplish similar functions ... Because each device independently operates effectively, a person having ordinary skill in the art, who was merely seeking to create a better device [], would have no reason to combine the features of both devices into a single device.”). The Petition identifies two “challenges;” yet each fails as having already been addressed by *Kliger* itself. Petition, 23-24.

First, the Petition alleges that “[r]eflections can occur at the splitter, resulting in inter-symbol interference to [*Kliger*’s] home network signal.” Petition, 23-24 (citing Ex. 1007, ¶ [0073]; Ex. 1010, 5; Ex. 1004, ¶ [0065]). This would not motivate a POSITA to make any changes to *Kliger* because *Kliger* already addresses this. Specifically, *Kliger*’s modem “enables the home network 10 to coexist with pre-

existing low quality splitters often found in cable networks.” Ex. 1007, ¶ [0073]. This cursory review of *Kliger* demonstrates that the Petition manufactures the first identified “challenge” because *Kliger*’s modem clearly addresses the reflections at the splitter. *Id.* As such, a POSITA would not be motivated to improve *Kliger* based on this “challenge.”

Even accepting the Petition’s manufactured issue with *Kliger*, the disclosure of *Isaksson* is not relevant to reflections *at the splitter*. The Petition identifies reflections at the splitter as the “issue” (Petition at 23-24), but *Isaksson*’s network does not include splitters and does not communicate over tap ports of any splitters. *Isaksson*, rather, provides a network that communicates over a simple point-to-point, architecture, as opposed to *Kliger*’s communication over splitters. *See, e.g.,* Ex. 1013, Fig. 1. Thus, there is no reason that a POSITA would look to *Isaksson* to solve issues regarding reflections introduced by splitters, and the Petition provides none.

Moreover, *Isaksson* provides an installed copper network for data distribution outside of the home. Ex. 1013, 24:8-28. The Petition’s issue concerns an in-home network over coaxial cabling. Dr. Williams fails to address these distinctions, and the Petition relies on nothing more than hindsight to identify and rely upon a reference that is inapplicable to the already solved “issue” of *Kliger*. These two networks have different interference, attenuation, carrier signals, and power

considerations. The Petition and Dr. Williams are silent regarding any of these differences.

Second, the Petition alleges that *Kliger's* network conditions are dynamic due to (1) the ability to add and remove network devices and (2) changing external conditions. And based on the dynamic nature of *Kliger's* network, “a carrier that was once clear of interference can later become overwhelmed with interference.” Petition, 23-24 (citing Ex. 1004, ¶ [0067]). But neither of these issues would motivate a POSITA to make any changes to *Kliger* because *Kliger* already addresses (1) adding and removing network devices and (2) changing external conditions.

Kliger solves the alleged “issue” of adding and removing network device through its registration process. Ex. 1007, ¶¶ [0089], [0108]-[0112]. During the registration period, the master HNM indicates where the new HNM appears in the transmission order and “the amount of bandwidth that has been allocated to the HMN.” *Id.*, ¶ [0110]. As new HNMs are added to the network, the master HNM may, for example, change the amount of bandwidth allocated to each HNM to guarantee quality of service. *Id.*, ¶ [0103]. This protocol demonstrates that *Kliger's* network is well-equipped to dynamically adapt to the number of HMNs and, in contrast to the Petition's contentions, adding or removing a network device would not cause a carrier to “later become overwhelmed with interference.” Petition, 24.

Kliger also solves the alleged “issue” of changing external conditions with self-train bursts. Ex. 1007, ¶¶ [0089], [0108]. Any HNM can issue a self-train burst, which “operate[s] to calibrate the HNM 28 to the transmission characteristics of the home network.” *Id.*, ¶ [0089]. Moreover, new HNMs transmit a self-train burst to adapt to the Phy parameters of the network. *Id.*, ¶ [0108]. Accordingly, HNMs may use self-train bursts to calibrate to the network changing conditions, and thus, the dynamic nature of *Kliger*’s network would not cause a carrier to “later become overwhelmed with interference.” Petition, 24.

Tellingly, neither the Petition nor Dr. Williams mentions *Kliger*’s registration process or self-train bursts. This functionality in *Kliger* defeats the Petition’s purported motivation to combine because it shows that whatever issues are caused by the “dynamic nature” of *Kliger*’s network are already solved by *Kliger*’s system. The Petition overlooks these disclosures in *Kliger* and thus does not explain how the non-obvious combination with *Isaksson* would function on *Kliger*’s network.

Finally, the Petition’s broad statements concerning “signal impairments, like interference and noise” do not save the Petition’s insufficient motivation. *See* Petition, 23. Such impairments are already addressed by the self-train bursts in *Kliger*, as they calibrate the devices to the transmission characteristics of the network. Ex. 1007, ¶¶ [0089], [0108]. At no point does the Petition explain why a POSITA *would* make this combination *to arrive at the Challenged Claims*. Instead,

the Petition wholly ignores the teachings of *Kliger* that are directed to solving the issues that the Petition purports to use as motivation. For this reason alone, Ground 1 fails for lack of motivation to combine.

b. *Isaksson's* “Base Sync Frames” Fail to Suggest Any Modification of *Kliger* to Arrive at the Claimed Probe Messages

Not only does the Petition rely on manufactured “issues” in *Kliger*, but the function of *Isaksson* is ***duplicative*** of *Kliger's* networking system. For example, the “base sync frames” of *Isaksson* would provide a function that is duplicative of the MAC protocol used in *Kliger*. As described in Section IV.A.1, HNMs transmit bursts over the backbone to communicate. Ex. 1007, ¶ [0085]. An HNM adapts to the Phy parameters of the home network via registration bursts. *Id.*, ¶¶ [0089], [0108]. MAC protocol also employs transmission power control, rendering the “base sync frames” unneeded. *Id.*, ¶ [0057]. Each HNM adjusts the power of network signals to ensure that the HRU receives signals at a predefined power level. *Id.*; see also Section IV.A.1 (detailing *Kliger's* power control).

As *Kliger's* disclosure demonstrates, the HNMs already (1) communicate channel characteristics via the MAC protocol and (2) provide adaptive power control of network signals. Ex. 1007, ¶¶ [0089], [0093], [0108]. A POSITA would not implement “base sync frames” on *Kliger's* network because it would simply be unnecessary. The Petition fails to explain why the MAC protocol and adaptive

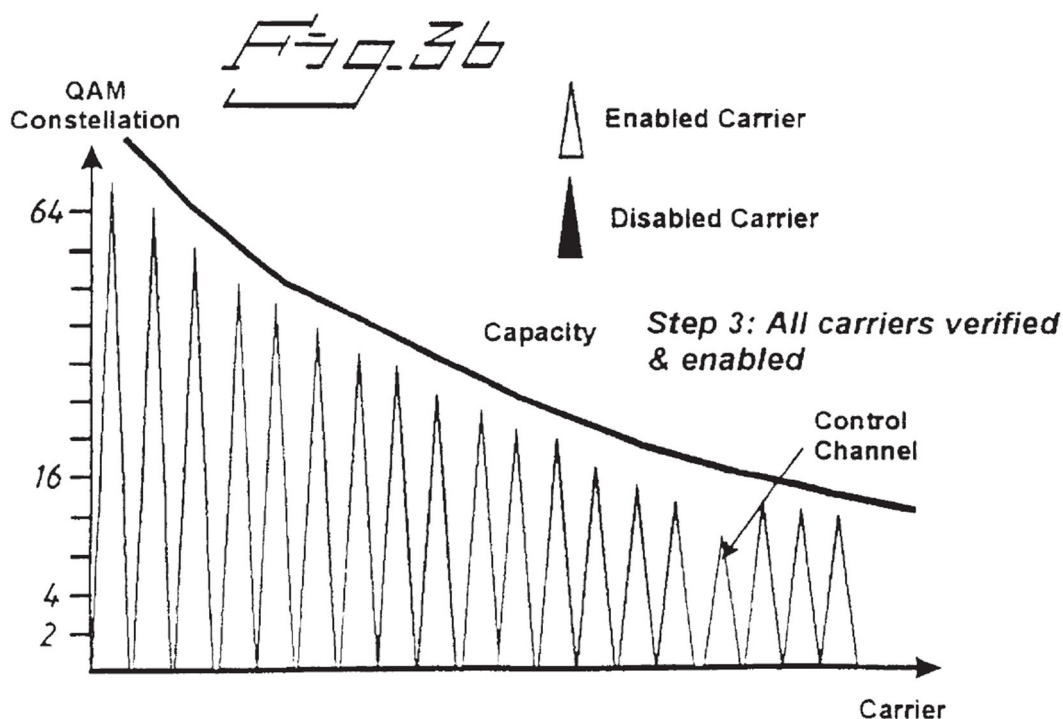
power control functionality of *Kliger* are insufficient to address the “issues” identified. This failure is a direct consequence of the Petition’s failure to address, let alone acknowledge, the pre-existing capabilities of *Kliger*.

5. *Isaksson*’s “Base Sync Frames” Would Alter the Intended Operation of *Kliger*’s HNMs

The Petition overlooks yet another key aspect of *Kliger*, and it proposes a combination that would alter the principle of operation behind *Kliger*. In particular, *Kliger* uses fixed constellation sizes for the transmission of data between its interface devices (*i.e.*, HNMs). *Isaksson*, by contrast, uses variable constellation sizes for data transmission. The Petition fails to explain how or why a POSITA would be motivated to combine *Kliger* and *Isaksson* given this critical technological difference. To the contrary, attempting the Petition’s proposed combination would fundamentally alter the principle of operation of *Kliger*, and thus a POSITA would not have been motivated to pursue it.

Kliger details the function of its HNMs for facilitating end device communication. The HNMs transmit data via burst over the backbone. Ex. 1007, ¶ [0091]. Notably, each HNM uses the **same constellation size** for transmitting data. *Id.*, ¶ [0099]. In direct contrast to the constant constellation size used by *Kliger*’s HNM for transmitting data, *Isaksson* dynamically changes the number of bits for each carrier wave. Ex. 1013, 3:24-27.

Figure 36 of *Isaksson* illustrates a channel in a fully configured system. *Id.*, 20:24-25, Fig. 36 (reproduced below). The system “transmits the bit-loading diagram (constellation) to the downlink transceiver,” and the receiver updates the constellation for each carrier wave. *Id.*, 78:5-79:5. As shown in Figure 36, the quadrature amplitude modulation (“QAM”) constellation varies depending on the carrier. *See id.*, Fig. 36. The number of bits and corresponding constellation size is proportional to the SNR of the carrier. *Id.*, 26:14-17. The higher the SNR, the higher the constellation size.



Ex. 1013, Fig. 36.

The Petition ignores this disclosure, instead proposing a combination that would alter the communication technique of *Kliger*. Petition, 23-28. *Kliger's*

disclosure centers around in-home communication using its HNMs, and “the constellation size is the same for each HNM 28 (when transmitting).” Ex. 1007, Abstract, ¶¶ [0040]-[0044], [0099]. Replacing *Kliger*’s method of transmitting data with *Isaksson*’s twister pair system would require such a change to *Kliger* that a POSITA would not be motivated to look to *Isaksson*, let alone pursue the proposed combination.

6. *Isaksson*’s “Base Sync Frames” Cannot “Determine Channel Characteristics” Within *Kliger*’s Network

Relying on the non-obvious combination of *Kliger* and *Isaksson*, the Petition contends that the resulting HNM would analyze *Isaksson*’s base sync frames to determine channel characteristics for bit loading selection. Petition, 26. Other than this conclusory description, the Petition fails to explain how the “base sync frames” would be able to estimate channel characteristics, a problem amplified by the fact that *Kliger* uses an intermediary device (HRU) that changes the signals’ properties.

To communicate, *Kliger*’s HNMs transmit signals upstream to the HRU (*i.e.*, the upstream signal path). Ex. 1007, ¶ [0055]. The HRU amplifies the signal power and shifts the RF frequency of the signal before reflecting the signal downstream to the receiving HNM (*i.e.*, the downstream signal path). *Id.*, ¶ [0056]. Unlike *Kliger*, *Isaksson* transmits the base sync frames over its point-to-point architecture **without** an intermediary device. Ex. 1013, 24:8-28, Fig. 1. Once the base sync frame is

received, the receiving device uses a base reference frame to determine characteristics of the point-to-point channel the frame just traversed. *Id.*, 10:10-14.

Kliger's HNM transmits signal upstream to the HRU. With transmission power control, the HRU receives the upstream signal at a predefined power level. Ex. 1007, ¶ [0057]. The HRU then alters both the power and frequency of the signal before the signal is transmitted downstream to the receiving HNM. *Id.*, ¶ [0056]. As *Isaksson* does not include an intermediary device that alters the properties of the base sync frames, *Isaksson* does not provide any disclosure regarding the process of determining channel characteristics via a signal that is transmitted along an upstream signal path, altered by an intermediary device, and transmitted downstream to a receiving device. The Petition fails to mention, let alone address, this fundamental architectural difference between *Kliger* and *Isaksson*. Instead, the Petition simply concludes that the receiving device “would analyze the received base sync frames to determine channel characteristics of the respective channels.” Petition, 26. In this regard, there is no explanation of how, or even which channel, would allegedly be “analyzed.”

Moreover, even assuming the receiving HNM could somehow reconstruct the upstream signal *before* the HRU alters the signal properties, the receiving HNM still would not be able to determine channel characteristics. As discussed in Section IV.A.1, each HNM employs transmission power control to account for signal

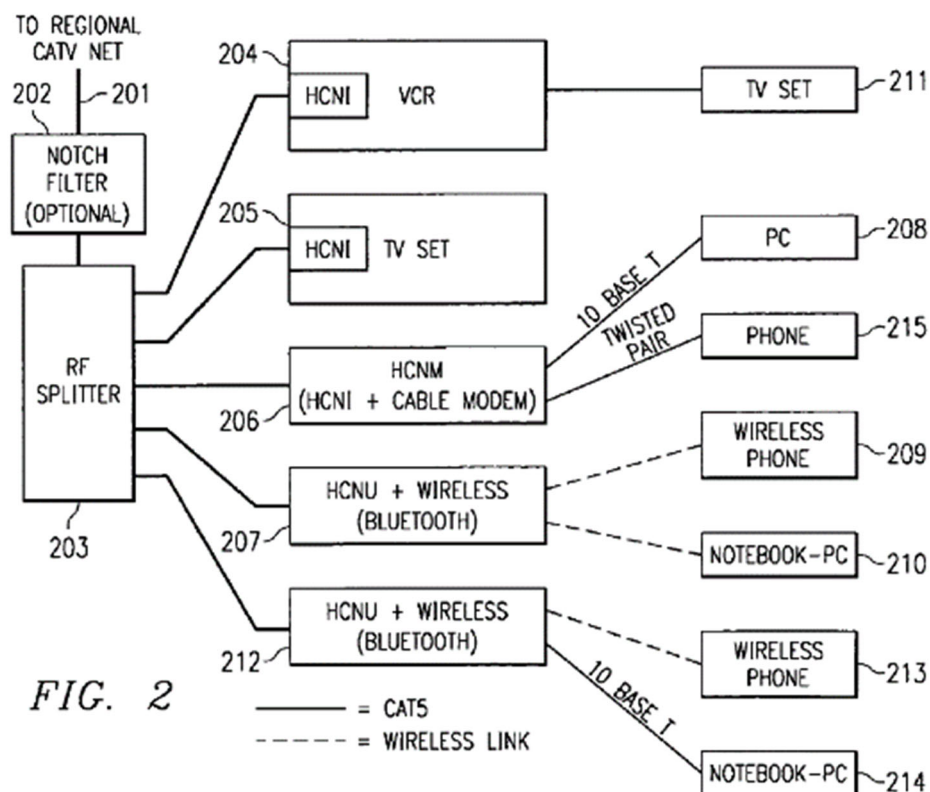
attenuation in the upstream path. Ex. 1007, ¶ [0057]. As a result, all upstream signals are received by the HRU at the same power level. *Id.* Thus, to the extent that the receiving HNM can determine the properties of the unaltered upstream signal, the power level of the upstream signal would be the same regardless of the originating HNM (or the channel characteristics of the upstream path). Without being able to differentiate between upstream signals, the receiving HNM could not simply “analyze the received base sync frames to determine channel characteristics” as the Petition concludes. Other than this conclusory statement, the Petition does not provide an explanation of how the combined system would function to arrive at the Challenged Claims.

B. Ground 2 Fails to Render Obvious the Challenged Claims

Ground 2 fails to render the Challenged Claims obvious over the combination of *Amit*, *Jacobsen*, and *Isaksson*. Petition, 42-81. The Petition uses the same flawed scheme as in Ground 1. Namely, the Petition uses the interface devices of *Amit* (rather than the HNMs of *Kliger*, which themselves are a type of “interface device”). Then, the Petition attempts to rely on *Isaksson* to again cobble together an obviousness challenge. As such, similar to Ground 1, Ground 2 fails to show a reasonable likelihood of success because the proffered motivation to combine is insufficient.

1. Overview of Amit

Amit discloses a home network system where subscriber devices can communicate over coaxial TV cables without transmission through a CATV head end device. Ex. 1004, 2:34-43. *Amit* refers to its system as the Home Cable Network (“HomeCN”). *Id.*, 2:49-58. Figure 2 illustrates a preferred embodiment of the HomeCN connected to a CATV plant via cable 201. *Id.*, 5:22-24, 6:26-28, Fig. 2. The HomeCN includes home networking devices (*i.e.*, 204-207 and 212). *Id.*, 6:26-36. The home networking devices include HCNU device 207 and HCNU device 212, which can communicate with each other. *Id.*, 6:57-64.



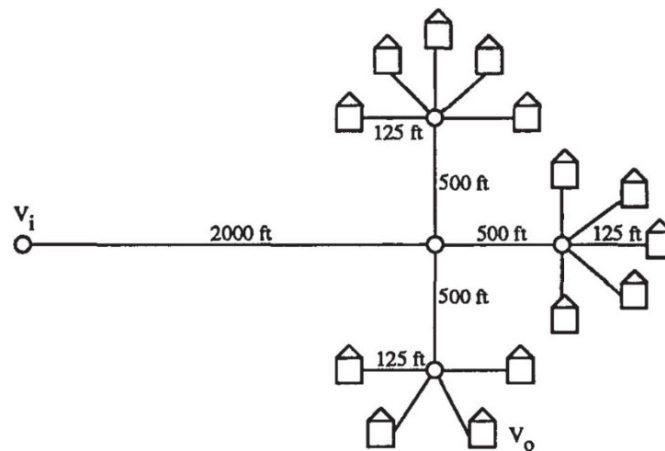
Ex. 1004, Fig. 2.

For example, the HCNU device 207 transmits a digital communication signal, which propagates in the CATV wires and is reflected by the RF splitter 203 to HCNU device 212. *Id.* In some embodiments, the HomeCN may also include a notch filter 202, which is a band reject filter that rejects the RF range used by the home networking devices (*i.e.*, 204-207 and 212). The presence of the notch filter 202 depends on the operational mode of the HomeCN. *Id.*, 7:23-36. In Single Home operation mode, there is a notch filter 202 while in Connected Home operation mode no notch filter exists. *Id.*; 7:12-14.

The HomeCN can use either QPSK or QAM 16 modulation methods for signal transmission. *Id.*, 8:30-37. *Amit* further explains that the modulation method should (1) function in the required frequency range; (2) support high bandwidth rate; and (3) support bursts with short learning time. *Id.*, 25:1-11. Based on these requirements, QPSK and QAM are *the* selected modulation methods. *Id.* Rather than address *Amit*'s requirement for *single-carrier* modulation, the Petition again avoids the actual technology of *Amit*, instead alleging that a POSITA (after reading *Amit*) would look to a different reference, *Jacobsen*, for multi-carrier signaling, thereby failing to address why the POSITA would have modified *Amit* as argued. Petition, 68-72.

2. Overview of *Jacobsen*

Jacobsen is a conference paper from a technical publication that compares single-carrier QAM with equalization and multi-carrier modulation for multimedia transmission on the cable television (“CATV”) network. Ex. 1016, 306.⁸ To test the performance of each modulation technique, a CATV channel model was used. *Id.*, 307, Fig. 2 (reproduced below). The simulations “indicat[ed] that discrete multitone modulation is more computationally efficient than single-carrier modulation with equalization for the transmission of digital data over CATV channels.” *Id.*, 312.



Ex. 1016, Fig. 2 at 307.

⁸ Like the Petition, the Patent Owner’s citations to *Jacobsen* use the original page numbers that appear at the bottom of each page (but above the stamped numbers).

Contrary to the Petition’s combination, *Jacobsen*’s disclosure is not applicable to *Amit*. First, *Jacobsen* simulates an out-of-home network as the basis for its conclusions—not an in-home network as *Amit* provides. *Id.*, 307. Second, *Jacobsen* uses a “6-MHz slot from 30-36 MHz as [the] simulated channel,” which is logical for the out-of-home system because most CATV systems provide an upstream channel that operates from 5 to 40 MHz. *Id.* However, *Amit*’s in-home network uses completely different frequency bands (*i.e.*, 900 to 960 MHz). Petition, 62 (citing Ex. 1014, 3:24-27, 8:21-29). As further detailed below, the Petition uses the frequency of *Amit* to its advantages in one section while turning a blind eye to the incompatibility of the frequencies between *Amit* and *Jacobsen* in other sections.

3. The Petitioner Fails to Show Motivation to Combine *Amit* and *Jacobsen*

A POSITA would not have been motivated to “improve *Amit*’s coaxial HomeCN by incorporating *Jacobsen*’s multi-carrier signaling on coaxial cables into *Amit*’s HCN devices,” as the Petition alleges. Petition, 47 (citing Ex. 1004, ¶ [0163]). As with Ground 1, the Petition ignores the fact that *Amit* already recognizes and addresses the alleged “challenges” or shortcomings of *Amit* that the Petition identifies. *See e.g., Kinetic Concepts*, 688 F.3d. at 1369; *Stryker Corp. v. Karl Storz Endoscopy America, Inc.*, IPR2015-00764, Paper 13 at 13 (PTAB Sept. 2, 2015) (“[W]e fail to see, and Petitioner does not adequately explain, why it would be

obvious to add a translator to redundantly perform the function that Petitioner maintains is performed by the interconnect devices and network computer located within the surgical network.”). To identify an alleged motivation to add *Jacobsen* to *Amit*, the Petition attempts to paint *Amit*’s home network with various issues. However, these “issues” are not issues at all and do not support a motivation to improve the network of *Amit* with *Jacobsen*. Each citation to *Amit* in the Petition is addressed below.

First, the Petition cites a passage from *Amit* alleging that “there *can* be ‘houses where there is a problem with reflection.’” Petition, 47 (citing Ex. 1014, 20:42-43). The Petition truncates the sentence of *Amit*, which fully reads, “[t]herefore this module can be inserted in houses where there is a problem with reflection.” Ex. 1014, 20:42-43. In other words, *Amit* discloses a module that addresses houses with reflection, to the extent such problems even existed. *See id.*, 19:65-20:43; *see also* Petition, 47 (acknowledging, “coax cable is an excellent communication medium”); *Polaris Industries*, 391 F.3d at 1068-69 (holding that the Board erred in “focus[ing] on what a skilled artisan would have been *able* to do, rather than what a skilled artisan would have been *motivated* to do.” (citing *InTouch Techs., Inc. v. VGO Commc’ns, Inc.*, 751 F.3d 1327, 1352 (Fed. Cir. 2014))). The “reflection” problem of *Amit* was already identified and solved by *Amit* and cannot be the basis to make an additional modification of *Amit*.

Second, the Petition identifies “high reflection” in *Amit*’s disclosure as an “RF challenge” that needs to be solved. *See* Ex. 1014, 13:52-14:8; Petition, 47-48. This identified “challenge,” however, demonstrates that *Amit* and *Jacobsen* are fundamentally incompatible references. *Amit* uses “high reflection” to *achieve* on-premises communication; *Jacobsen* attempts to *eliminate* signal reflections because *Jacobsen* concerns head end communications.

Amit’s disclosure explains that the “high reflection” is intentionally sought out and used in a beneficial manner in certain embodiments of its home network. For example, “the reflection from the notch filter is in the power of the signal or it might be higher. When this reflection is higher than the signal *we can use this* reflection as our main signal.” Ex. 1014, 14:1-7; *see also id.*, 3:37-42 (“The quality of the signal transmitted by one subscriber device to another subscriber device can be further improved *by deliberately using splitters with high reflections.*”), 6:41-44, cl. 12 (reciting an “RF element further compris[ing] a splitter with high reflections”). A POSITA would have understood that *Amit*’s home network intentionally leverages this “high reflection” and thus a POSITA would see “solving” this “issue” as contradicting *Amit*’s teachings. In short, without reflections, *Amit* would not function as intended.

Whereas *Amit* seeks to leverage high reflection, *Jacobsen* seeks to eliminate it. The Petition explains that *Jacobsen* “observes that in coaxial networks ‘[t]aps,

amplifiers, and splitters can all cause signals to be *reflected* at their insertion points,’ and resulting ‘*variations in a channel’s frequency response* cause successively transmitted symbols to interfere with one another.’” Petition, 48 (citing Ex. 1016, 305; Ex. 1004, ¶ [0166] (original emphasis)). *Jacobsen* attempts to address these reflections through multi-carrier modulation. Petition, 48 (citing Ex. 1016, 305-306). However, *Amit*’s home network *intentionally* introduces splitters with high reflection to facilitate device communication. See Ex. 1014, 14:1-7, 3:37-42, 6:41-44, cl. 12. Thus, in *Amit*, “high reflection” is a property to be leveraged, not a problem to be solved. A POSITA would not have looked to *Jacobsen* because there would have been no problem to solve and because *Jacobsen*’s teachings regarding reflections are incompatible with *Amit*’s uses of it.

The Petition also cites “the hidden node problem” as an “RF challenge[] in designing the HomeCN components” of *Amit*’s network. Petition, 47 (citing Ex. 1014, 13:54-14:1). *Amit* explains that isolation differences between nodes may cause the “hidden node problem.” See, e.g., Ex. 1014, 13:55-61. This, however, does not provide a sufficient motivation to even look to, let alone modify in view of, *Jacobsen*. The Petition never even attempts to explain how or why any teaching of *Jacobsen* would address this alleged “problem.” Instead, the Petition uses *Jacobsen* for teachings regarding multi-carrier signaling, but then fails to connect any aspect of those teachings to the “hidden node problem” in the first instance. Petition, 47-

49. In other words, the Petition identifies the “hidden node problem” as a motivation to add *Jacobsen*, but then fails to explain why *Jacobsen* would even address this issue. Thus, the Petition provides no motivation to add any teaching of *Jacobsen* to *Amit*.

Accordingly, a POSITA would not have made the proposed combination. *In re Urbanski*, 809 F.3d 1237, 1243 (Fed. Cir. 2016) (“If references taken in combination would produce a seemingly inoperative device such references teach away from the combination and thus cannot serve as predicates for a prima facie case of obviousness.”) (cleaned up); *Plas-Pak Industries, Inc. v. Sulzer Mixpac AG*, 600 F. App’x. 755, 758 (Fed. Cir. 2015) (“[C]ombinations that change the basic principles under which the prior art was designed to operate, or that render the prior art inoperable for its intended purpose, may fail to support a conclusion of obviousness.”) (cleaned up).

Further, a POSITA would not be motivated “to replace the single-carrier modulation in Amit’s HomeCN with Jacobsen’s multi-carrier signaling.” Petition, 50. As introduced in Section IV.B.1, the home-networking device of *Amit* “**must** provide QPSK and QAM 16.” Ex. 1014, 8:30-37. The Petition ignores this disclosure and, instead, replaces *Amit*’s required modulation methods (classified as signal-carrier methods by the Petition) with the multi-carrier modulation method of *Jacobsen*. Petition, 49-50 (citing Ex. 1021, Ex. 1023).

Amit therefore teaches away from the use of a multi-carrier modulation because *Amit* explicitly requires single-carrier modulation. Ignoring this teaching away, the Petition’s proposed combination uses hindsight to replace *Amit*’s single-carrier modulation with *Jacobsen*’s multi-carrier modulation to arrive at the Challenged Claims. Petition, 50; see *Sharkninja, Inc. et al v. Dyson Technology Limited*, IPR2023-01322, Paper 7 at 25 (PTAB Feb. 27, 2024) (“A reference teaches away from a claimed invention if it ‘criticizes, discredits, or otherwise discourages’ modifying a reference to arrive at the claimed invention.” (quoting *In re Fulton*, 391 F.3d 1195, 1201 (Fed. Cir. 2004))); see also *Polaris Industries*, 391 F.3d at 1068-69 (holding that the Board erred in “focus[ing] on what a skilled artisan would have been **able** to do, rather than what a skilled artisan would have been **motivated** to do.” (citing *InTouch Techs.*, 751 F.3d at 1352))).

These shortcomings demonstrate why the Petition does not provide a fulsome description of the technology and relies on the overly broad positions that a POSITA would have been motivated to implement *Jacobsen* on *Amit*’s home network simply because multi-carrier signaling of *Jacobsen* is more efficient than the signal carrier signaling of *Amit*. This motivation is legally insufficient. The full disclosures of *Amit* and *Jacobsen* show that a POSITA would not be motivated to implement the proffered combination to arrive at the Challenged Claims.

4. The Petitioner Fails to Show Motivation to Combine *Amit* and *Jacobsen* with *Isaksson*

A POSITA would not be motivated to combine any teachings of *Isaksson*, which relates to communication infrastructure *outside* of a home network implemented on *twisted pair cabling*, with *Amit*, which relates to communication infrastructure *inside* of a home network. The Petition initially explains that *Amit*'s "HomeCN does not interfere with VDSL," and alleges that this shows the relatedness between coaxial and non-coaxial wired networks. Petition, 53. The Petition fails to explain how "the relatedness between coaxial and non-coaxial wired networks" supports implementing communications over twisted pair on a home coaxial network. *Id.*

The Petition then incorrectly states that "Isaksson recognizes that its features can extend to coaxial networks." Petition, 53 (citing Ex. 1013, 1:8-18, 3:4-15). The cited passage, reproduced below, does not support the Petition's representation of *Isaksson*. Petition, 53 (citing Ex. 1013, 1:8-18).

The demand for provision of multi-media and other bandwidth services over telecommunications networks has created a need to transmit high bit rate traffic over copper pairs. This requirement has led to the development of a number of different transmission schemes, such as, ADSL and VDSL. One of the more likely modulation systems for all these transmission schemes is a line code known as DMT (discrete multi-tone), which bears some resemblance to orthogonal frequency division multiplex, and is a spread spectrum transmission technique.

Ex. 1013, 1:8-18.

In contrast to the Petition’s allegation, *Isaksson*’s disclosure explains that various transmission schemes were developed in response to a need to transmit high-rate traffic over copper pairs. *Id.* One such scheme was DMT. *Id.* The Petition, however, fails to explain how this portion of *Isaksson* (*i.e.*, the overview of the background) “recognizes that its features can extend to coaxial networks.” Petition, 53 (citing Ex. 1013, 1:8-18). To the contrary, this portion highlights the technological differences between *Isaksson* and *Amit*. *Isaksson* is specific to transmission and modulation schemes over copper pair while *Amit* provides an in-home network over coaxial cables.

The Petition’s second citation states that “the DAVIC specification reverses this order to enable *premises distribution* of VDSL signals over coaxial cable systems.” Ex. 1013, 3:13-15. But this single sentence does nothing to disturb the disclosure as a whole of *Isaksson*, which is entirely directed towards the distribution of signals *to* the home. Nor does it suggest that the DAVIC specification is directed to distribution *within* the home. Even if it were assumed this were the case, nothing in *Isaksson* teaches how that specification would handle such distribution. In sum, *Isaksson* does not support the Petition’s hindsight-driven conclusion that *Isaksson*’s features (*e.g.*, the distribution of signals *to* the home) can extend to coaxial cables within the home; rather, *Isaksson* instead consistently reiterates that its system

applies to twisted pair cabling. *See, e.g., id.*, 24:8-10. As such, *Isaksson* names its system Multi-carrier System for the Installed Copper network (“MUSIC”). *Id.*

Further, a POSITA would not have looked to *Isaksson* because *Isaksson* contains no teachings whatsoever on sending or receiving data over communication channels that traverse the tap ports of coaxial splitters, as in *Amit*. *Isaksson* does not mention—let alone discuss in detail—any of the important aspects of this communication channel, including reflection, attenuation, and isolation. Neither the Petition nor Dr. Williams address any of these issues. Instead, they argue that *Amit*’s system “does not interfere with VDSL” and can “connect to non-cable infrastructures.” Petition, 53 (citing Ex. 1014, 2:24-30, 28:67). But this is not motivation to **modify** the coaxial network of *Amit*. To the contrary, it suggests that other network types would connect **separately** to *Amit*’s coaxial network, not change its operation.

The sole motivation offered by the Petition is the stated desire to achieve “synchronized bit-loading” to “prevent the connections between *Amit*’s HCN devices from failing due to one HCN device sending more/fewer bits per carrier than another HCN device expects.” Petition, 52. But *Amit* does not suffer from this failing because it uses single-carrier modulation, whereas the issue of “sending more/fewer bits per carrier” arises in multi-carrier signaling. Thus, the “problem” identified in the Petition was introduced by the Petition itself by proposing to

combine *Amit* and *Jacobsen*, which a POSITA would not have done. *See* Section IV.B.3, *supra*. The Petition cannot combine two incompatible references, create new problems that the art itself did not suffer from, and then point to a third reference as the solution for the problems created by the proffered combination.

In view of this key distinction, a POSITA would not be motivated to combine *Amit* and *Isaksson* because *Isaksson* is not pertinent to any of *Amit*'s potential issues caused by communicating over splitters.

These fundamental technological differences between the references demonstrate why the Petition fails to provide a sufficient motivation to combine. *Isaksson* relates to communication infrastructure *outside* of a home network over twisted pair while *Amit* provides an *in-home* network over coaxial cabling. A POSITA would not be motivated to implement the proffered combination to arrive at the Challenged Claims; therefore, this Ground must fail.

C. The Petition Lacks Clarity

The Petition intentionally avoids the language of the Challenged Claims, both in the section headings and throughout its analysis, placing an unreasonable burden on the Patent Owner and Board to determine whether the Petition even addresses all of the language of any given claim element. Moreover, by not including the claim language in the body of the Petition, the Petition managed to reduce its wordcount by 352. As the as-filed Petition is certified to have 13,826 words, it is clear this was

a strategic decision to circumvent the word count. *See* Petition, 99. Moreover, the Petition relies on an improper citation and exhibit format, where it hyphenates its exhibits to DISH-10## to reduce the word count from two words for “Exhibit 1001” to one word for “DISH-1001.” This happened 402 times in the Petition. The Petition also removed all spaces between the paragraph symbol and the following numeral, again changing the word count from two words for “¶ 57” to one word for “¶57.” This happened 202 times in the Petition. Each is improper. *See Arthrex, Inc. v. Jeffrey Gelfand, M.D.*, IPR2023-00014, Paper 9 at 16-19 (PTAB March 31, 2023).

As this Board has held, the Consolidated Trial Practice Guide provides that “[e]xcessive words in figures, drawings, or images, *deleting spacing between words*, or using excessive acronyms or abbreviations for word phrases, in order to circumvent the rules on word count, may lead to a party’s brief not being considered,” and also states that, “[i]f an opposing party raises a word count limit violation or abuse, the Board will consider such a violation or abuse on a case-by-case basis.” Consolidated Trial Practice Guide 40 (Nov. 2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“TPG”). The deletions and omissions found in the Petition amount to shortcuts that are inconsistent with normal citation practice. Such tricks are grounds to deny institution. 37 C.F.R. § 42.24(a)(2) (“Petitions to institute a trial *must* comply with the stated word counts”).

These shortcuts coupled with the additional 936 words found in the 29 figures reproduced in the Petition, and the additional 242 words of annotations added to those 29 figures, increase what was certified as 13,826 words to over 16,000 words.⁹ Unlike the 700 words of excess in *Arthrex*, Dish's Petition is over by 2,000 words. This is grounds enough to deny institution.¹⁰

⁹ Based on Patent Owner's count, the Petition included 13,921 words, however that hundred-word difference can be attributed to differences in the manner that different word-processing engine count words; the 1,500 extra words from the omission of claim language and the figures cannot be attributed to such differences and the approximately 7 extra pages of argument is an additional reason to deny this non-conforming Petition.

¹⁰ Patent Owner recognizes the requirement to promptly raise this issue with the Board after discovery. However, the degree of this transgression did not come to light until this Preliminary Patent Owner Response was almost complete. As a result, Petitioner's improper formatting to avoid the word limit compounds with the Petition's unclear mapping of the claim limitations, warranting at least an increased word limit for the Patent Owner Response to the extent the Board does not view this transgression as grounds to deny institution. 37 C.F.R. §

The Petition’s claim element headings fail to recite a single claim term and, instead, simply conclude that claims 1 and 3 are either rendered obvious by the non-obvious combinations of *Kliger* and *Isaksson* or *Amit, Jacobsen*, and *Isaksson*. See Petition, Table of Contents. The Petition’s analysis regarding the sub-elements of the Challenged Claims fares no better. For example, rather than clearly map the language of each claim element to the prior art, the Petition simply refers to a short-hand version of each element (*e.g.*, [1pre], [1a.i], etc.). Using these short-handed versions, the Petition fails to provide clear conclusions, leaving the Board to assume how various sub-elements relate to the prior art disclosure.

For example, regarding [1a.i], the Petition seems to match the “plurality of modules” with the claim language of “at least two network devices.” See Petition, 29. The Petition then introduces “home-network modules,” without explaining how these modules relate to any nodes or network devices. *Id.* While this may be considered an insignificant distinction, the Petition’s analysis highlights a common approach in avoiding clear comparisons between the prior art and claim language.

42.24(a)(2) (“Petitions to institute a trial ***must*** comply with the stated word counts.”).

In a further example, regarding [1d.i], the Petition states that *Isaksson* transmits base sync frames “through the cable wiring.” Petition, 38. The claim language specifically recites the structure of the “cable wiring” in [1b] to include “a splitter” and “a plurality of segments of coaxial cable,” which are not disclosed in *Isaksson*. See Petition, 34 (relying on *Kliger* to teach the claimed cable wiring). By failing to clearly map the sub-elements to the prior art, the Petition is either intentionally masking the gaps in its analysis or inadvertently mixing its theories. In either case, the Petition burdens the Board to piece together its unclear analysis.

When the Petition does reference the claim language, the analysis is still unclear. In one example, claim 1 of the ’518 Patent requires “a multi-carrier modulator for modulating data” and “a multi-carrier demodulator for demodulating the translated RF signal to produce data.” Ex. 1001, cl. 1. As recited in the claim language, the network devices include a ***multi-carrier*** modulator and a ***multi-carrier*** demodulator, which permit multi-carrier signaling. *Id.*

Amit does not teach the recited multi-carrier modulators. The Petition acknowledges this shortcoming, explaining that *Amit*’s modulation scheme is a single-carrier modulation scheme. Petition, 49-50 (citing Ex. 1021, Ex. 1023); see Ex. 1014, 4:11-14 (“[T]he headend assigns ***the*** carrier frequency and bandwidth to each home network.”). Nevertheless, the Petition clouds its position, explaining that “*Amit*’s HCN devices communicate using multi-carrier signaling.” Petition, 76. In

other instances, the Petition intentionally reads out the term “multi-carrier” to improperly conclude that “Amit discloses the claimed ‘modulator for modulating data’ and ‘demodulator for demodulating the translated RF signal to produce data.’” Petition, 62-68 (citing Ex. 1004, ¶ [0232]).

V. CONCLUSION

For the reasons set forth above, the IPR should not be instituted.

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Respectfully submitted,

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Certification of Word Count Under 37 C.F.R. § 42.24(d)

The undersigned hereby certifies that the foregoing contains 10,635 words according to the word count of the word-processing software used to prepare the foregoing and accounting for the words in the figures as required by the Trial Practice Guide.

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CERTIFICATE OF SERVICE

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