

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

DISH NETWORK CORPORATION, DISH NETWORK L.L.C., DISH
NETWORK SERVICE L.L.C., and DISH NETWORK CALIFORNIA
SERVICE CORPORATION,
Petitioners,

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

CASE: IPR2024-00546

U.S. PATENT NO. 8,621,539

PATENT OWNER'S PRELIMINARY RESPONSE

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EXHIBIT LIST

Exhibit Number	Description
Ex. 2001	U.S. Patent Publication No. 2017/0180176

I. INTRODUCTION

Patent Owner, Entropic Communications, LLC (“Entropic”), submits this Patent Owner Preliminary Response (“POPR”) pursuant to 37 C.F.R. § 42.107(a) to the *Inter Partes* Review (“IPR”) 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” or “Dish”) for Claims 1-7 of U.S. Patent 8,621,539 (the “’539 Patent”). The Board should deny institution.

The ’539 Patent claims an improvement on a local coaxial network that allows a modem to communicate to the nodes of the local network more efficiently. To improve signal reliability and robustness of a communications channel, the ’539 Patent describes a system where the MAC layer of a modem measures node delay spread on the network using a probe packet. Based on the measured node delay spread, the MAC layer adjusts parameters of transmission accordingly. Adjustments are made to, for example, the preamble and cyclic prefix, based on these probe messages in an effort to optimize the communications for a given channel.

The Petition and the prior art references of Ground 1,¹ *Hou*² and *Konschak*³, fail to disclose the modem-node structure of the '539 Patent. Instead, *Hou* describes an out-of-premise network and the communication between a cable modem termination system (CMTS) and various connected homes. The Petition improperly combines *Hou*'s single reference to "Echo Delay Spread" with *Hou*'s ranging protocol (a protocol that has nothing to do with any delay spread), without any basis to do so.

To remedy these clear issues with *Hou*, the Petition relies on an entirely incompatible reference: *Konschak*. *Konschak* describes a wireless network where buildings may disturb or reflect signals between a mobile device and a base station. *See infra* Section III.B. However, the Petition fails to provide a sufficient motivation to combine *Hou* and *Konschak*, as (1) there is no basis to incorporate *Konschak*'s OFDM techniques into *Hou*, as (among other reasons) doing so would be inconsistent with *Hou*'s teaching of DOCSIS compliance, and (2) a POSITA would

¹ Ground 1 challenges independent Claim 1, Ground 2 challenges dependent claims 2-7.

² US 6,898,755 (Ex. 1005).

³ European Patent No. 1,065,855 (Ex. 1006).

not be motivated to modify *Hou* to include teachings of *Konschak* because those teachings are directed towards remedying issues encountered on a wireless network.

As a result, the *Hou-Konschak* combination of Ground 1 fails to render obvious Claim 1. Further, because dependent Claims 2-7 depend from independent Claim 1, the entirety of Ground 2 should be rejected. It is axiomatic that, if the prior art does not demonstrate that an independent claim is unpatentable, it cannot be used to demonstrate that any corresponding dependent claim is also unpatentable. *See Hartness Int'l Inc. v. Simplimatic Eng'g Co.*, 819 F.2d 1100, 1108 (Fed. Cir. 1987). Accordingly, the Petition should be denied.

II. SUMMARY OF THE '539 PATENT

A. Background of the '539 Patent

The '539 Patent is directed to optimizing packet transmission between terminal devices in a building using existing coaxial cabling. This cabling connects terminals within a building, also referred to as “nodes.” Ex. 1001, 1:37-39. These nodes, in turn, may be connected to or comprised of Consumer Premise Equipment (“CPEs”) such as cable television set-top boxes and televisions. *Id.*, 1:39-42, 2:47-53. The '539 Patent discloses exchanging probe messages between these nodes to measure node delay spread on the network, and then optimizing parameters of the packets transmitted over the network based on the measured node delay spread. *Id.*, 9:62-65. Such parameters include the preamble and cyclic prefix of the packets. *Id.*

Prior art broadband cable systems, as depicted in Figure 2, may include a multi-tap device 204 that allows signals to be distributed to a point-of-entry (POE) of a home, and communicated to through a variety of splitters 214, 222, 230, 234 to a number of node devices 228, 250, 252, 254, 256, 258, 260:

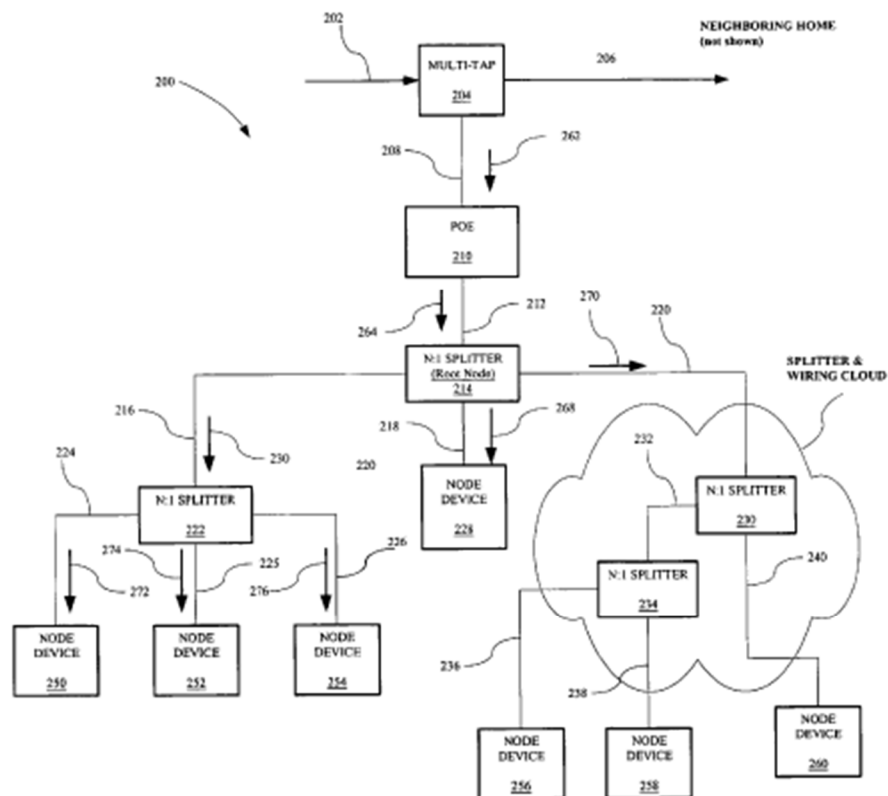


FIG. 2 (Prior Art)

Id., 2:17-27, Fig. 2. These node devices may be connected to or comprise a variety of CPEs such as cable converter boxes, televisions, video monitors, cable modems, cable phones, and video game consoles. *Id.*, 1:39-43, 2:47-53.

In-home networks, however, were not capable of providing the data rates and reliability required for video and audio networking between CPEs. *Id.*, 3:23-27. Existing broadband cable networks utilize cable splitters to split incoming signals from a POE into numerous signals that pass to different nodes in different rooms. *Id.*, 3:51-54. Cable splitters were designed to minimize signal transfer between output ports, so conventional wisdom suggested that the splitters would **prevent** networking between CPEs. *Id.*, 3:54-61. Due to the growing number of increasingly complex CPEs, there was a need to interconnect CPEs to enable sharing multi-media content and other functionalities, creating a system to connect a variety of CPEs on a local area network (LAN). *Id.*, 4:21-33.

To resolve this issue, the '539 Patent discloses a system with a transmitter ("PHY Transmitter") for communication between a plurality of nodes in a multi-media network communication system ("MNCS"). *Id.*, 4:37-42. The PHY Transmitter provides an interface to a coaxial cable in a broadband cable network ("BCN") and performs the RF, analog, and digital processing required for transmitting MAC messages on the coaxial communications channel. *Id.*, 4:42-46. The PHY Transmitter enables direct node to node communications on the coaxial communications channel. *Id.*, 4:46-48. This implementation allows a virtual logical

mesh network between various nodes 302, 304, 306, 308 with communication channels 310, 312, 318, 312, 322, 324, 326, 328:

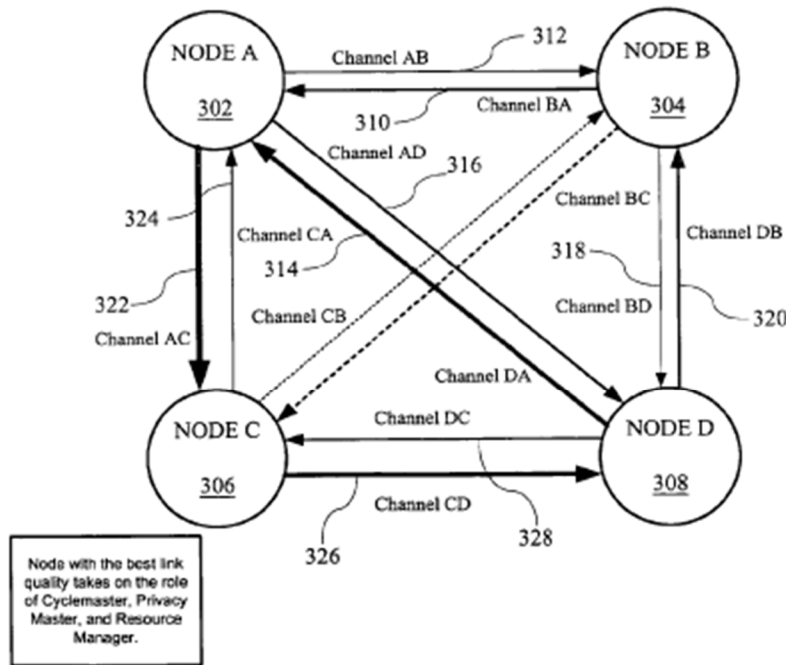


FIG. 3

Id., 6:48-51, 7:13-25, Fig. 3. However, these channels may be asymmetric and require different modulation schemes depending on the channel's ability to handle signals between each node. *Id.*, 7:4-7.

Probe packets may be used to calibrate, maintain, and optimize channels based on this asymmetry. *Id.*, 9:53-55. Probe packets are exchanged under the control of the MAC layers of the different nodes under the supervision of a Network Controller. *Id.*, 7:39-45. Once the information from the probe messages is obtained, the system

can adjust the transmission parameters to optimize the communications for a given channel. *Id.*, 9:53-65.

One type of probe packet “measure[s] node delay spread on the network in order to optimize the preamble and Cyclic Prefix (‘CP’) requirements or other parameters.” *Id.*, 9:62-65. The MAC layer’s utilization of the probe to optimize the preamble and CP of the coaxial network is readily apparent in the modem recited in Claim 1, which states:

1. A modem for communication to at least one node across at least one channel of a coaxial network, the modem comprising:
a transmitter; and
a MAC layer in signal communication with the transmitter, the MAC layer using at least one probe packet as an echo profile probe to measure node delay spread on the network and the MAC layer optimizing the preamble and cyclic prefix requirements or other parameters in response to the measured node delay spread on the network;
wherein the transmitter communicates the at least one probe packet.

Id., Cl. 1.

B. Prosecution History of ’539 Patent

During prosecution, then-pending Claim 47, which issued as Claim 1 of the ’539 Patent, was twice rejected under 35 U.S.C. 103(a) as being unpatentable over Bell (U.S. Patent No. 6,052,380) in view of Draves JR, et al. (U.S. Publication No.

2005/0185632 A1) and further in view of Walton (U.S. Publication No. 2005/0120097). Ex. 1002, 403, 431. Applicant appealed the rejection. *See, id.*, 462. After considering Applicant's appeal arguments, the Office issued a notice of allowance. *Id.*, 489-492.

The prosecution history makes clear that the '539 Patent is directed to the use of probe packets in a LAN. For example, the '539 Patent itself is titled "Physical Layer Transmitter for Use in a Broadband *Local Area Network*["⁴ Ex. 1001, Title. On appeal, Applicant highlighted this scope, arguing that the claims related to "improving the ability of a network of nodes *within a home entertainment network* (or other such entertainment network) to communicate with one another over existing coaxial cables that are preinstalled *in many homes and buildings* today." Ex. 1002, 467. Applicant also noted the '539 Patent addresses the issue encountered on a local coaxial network, where internode communication is impeded by distortion and high attenuation when a signal traverses a splitter. *Id.*

C. Claim Construction

The Petition was filed after November 13, 2018, and, as such, the proper claim construction standard to be applied is articulated in *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005), in accordance with its regulation, 37 C.F.R. § 42.100(b).

⁴ All emphasis added unless otherwise noted.

Apple Inc. v. Firstface Co., No. 2021-1001, 2021 WL 4156323, at *1 n.1 (Fed. Cir. Sept. 13, 2021). Petitioner did not offer any specific construction for any claim terms. Entropic reserves its right to respond to any construction Petitioner later proposes.

III. SUMMARY OF THE PRIOR ART

A. Hou

Hou is directed towards improving a communication channel between a Cable Modem (CM) and a CMTS by increasing physical layer flexibility in the cable modem system. Ex. 1005, Abstract. *Hou* improves physical layer flexibility on the CM-CMTS channel by having the CMTS maintain performance statistics of each CM and assigning appropriate dynamic burst profiles to dynamic burst profile compatible CMs. *Id.*, 6:34-42. *Hou*'s system assigns these burst profiles to balance signal robustness with bandwidth efficiency. *Id.*, 8:59-65, 9:38-42. The CMTS's maintenance of performance statistics is done independent, and without any prompting, from the CM. *Id.*, 7:13-24.

In maintaining performance statistics of each CM, the CMTS takes measurements of a variety of characteristics on a per-CM basis so the CMTS can assign appropriate burst profiles to the different CMs. *Id.* 13:1-14. One measurement taken by the CMTS is "Echo Delay Spread (measurement of Amplitude of echo and its delay)." *Id.* However, *Hou* provides no further

description or reference to this measurement, no detail regarding how this measurement is taken or used, and no detail regarding the source of such a measurement. *See id.*

Hou's network differs significantly from the network of the '539 Patent. Unlike the '539 Patent, *Hou* describes a system that addresses external (e.g., out-of-premise) communication that relies on equipment on a wide area network. *See id.*, Abstract, 1:39-45. This wide area network connects CMs at a subscriber's location to a shared CMTS outside of the subscriber's home coaxial cable wiring. *Id.* As depicted in Figure 1 of *Hou*, the CMTS 4 is located at the headend 2 and connects to one or more CMs 14 located at subscriber 12 premises via a network 6 using coaxial cable, hybrid fiber coax, or wireless:

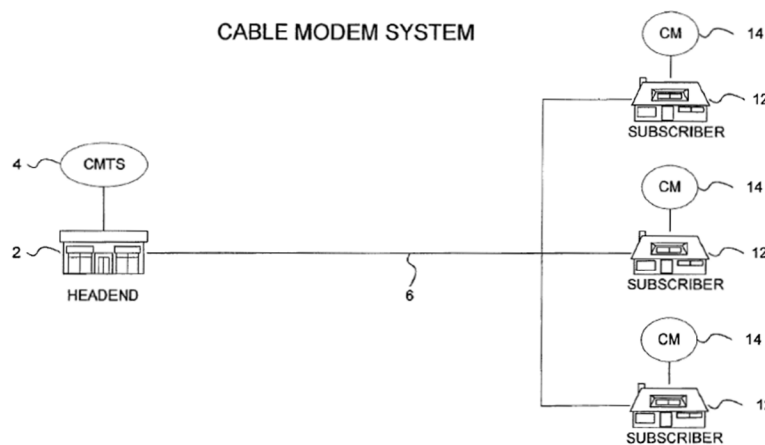


FIG. 1 (PRIOR ART)

Ex. 1005, Fig. 1; *see also*, Ex. 1005, 1:29-34.

Unlike the local network of the '539 Patent, *Hou's* network involves substantial “physical distance between the CMTS 4 and the CM [14],” which results in a “time delay [that] can vary greatly and be in the millisecond range.” *Id.*, 2:58-60. *Hou* does not describe any multipath effects arising from communications over its long-range wired system. In its background section, *Hou* briefly refers to a “ranging protocol” that was used in the prior art to measure this time delay. *Id.*, 2:58-3:3. *Hou* does not state, describe, or suggest any use of this ranging protocol in its invention.

Hou's system also mandates DOCSIS 1.0/1.1 compliance. *Id.*, 6:42-45; 7:26-28 (“the CMTS assigns burst profile per the current DOCSIS (industry-wide) specification”). A DOCSIS system uses TDMA techniques with QPSK and 16 QAM modulation techniques. *See*, Ex. 1005, 3:8-10 (“The modulation forms are QPSK (2 bits per symbol) and 16-QAM (4 bits per symbol)”). Such modulation techniques are necessary to maintain compliance with this DOCSIS standard. *See*, Ex. 1029, 27 (Explaining DOCSIS 1.0 systems utilize TDMA with QPSK and 16 QAM modulation formats in the upstream direction.).

B. Konschak

Konschak is directed to setting a value for the length of a cyclic extension between two consecutive OFDM signals on a wireless telecommunications system

such as a radio frequency telecommunications system. Ex. 1006, Title Page, [0001]. While *Konschak* utilizes OFDM symbols, the disclosure does not teach that OFDM is preferred, nor does it describe any benefits of OFDM over alternative methods of modulation.

Unlike the '539 Patent, *Konschak* is a *wireless* network and does not discuss a wired or coaxial cable network. *Id.*, [0002]. *Konschak* explains that transmission of signals over wireless communication apparatuses strongly depend on respective environments. *Id.* The transmissions may be impacted by multiple different phenomena as a result, such as reflection, absorption, and/or refraction. *Id.* Transmissions may spread in the time domain, and due to multipath effects, consecutive symbols may experience intersymbol interference (ISI). *Id.*, [0002]-[0003]. Inserting a cyclic extension between consecutive OFDM symbols on the transmitter side mitigates this ISI, allowing for a clearer signal. *Id.*, [0004]. *Konschak* attempts to limit unnecessary overhead caused by the cyclic extension while maintaining transmission quality by determining the delay profile of the communications channel. *Id.*, [0006]-[0007], [0009]. *Konschak*'s system includes a "determining means" that compares a received reference symbol with an expected reference symbol and extracts a channel delay profile from the comparison. *Id.*, [0014].

C. Ranging Protocol

Although not explicitly relied upon as a reference, the Petition relies heavily upon the use of a “ranging protocol.” In its discussion of ranging, the Petition relies heavily on *Min* (US Pub. No. 2002/0191684, Ex. 1018). Petition, 35. However, the Petition does not rely upon *Min* as a reference for any of its grounds. *Id.*, 2-3. Neither *Hou* nor *Konschak* mention ranging “requests” or “responses,” and the Petition does not rely on any combination of *Hou* and *Konschak* with *Min*. Further, *Hou* refers to a “ranging protocol” only as background to its invention, not as part of its system. *See* Ex. 1005, 2:58-3:3. *Konschak* does not mention any ranging protocol at all.

Ranging protocols may involve a CM transmitting a ranging request (RNG-REQ) to a CMTS. Ex. 1018, [0082]. The CMTS may then receive the ranging request from the CM and determine adjustments to the timing, power, and equalization coefficients of the network. *Id.*, [0088]. Once the CMTS determines these adjustments, the CMTS sends a ranging response which is received by the CM. *Id.*, [0090]-[0091].

A ranging procedure may be used to indicate the appropriate upstream channel for a CM, as well as provide an indication as to timing, power, frequency, and equalization needs for that channel. *Id.*, [0083]. There is no indication within the

Petition or any of the prior art references relied on by the Petition that a ranging protocol is used to measure Echo Delay Spread.

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

Grounds 1 and 2 rely upon references with fundamental structural differences—both from the claimed invention of the '539 Patent as well as each other. Not only do these differences render the proposed combinations non-obvious and defeat any motivation to combine the teachings of the references, the proposed combinations also fail to disclose each and every aspect of the challenged claims.

The Petition includes several fundamental flaws. *First*, the Petition relies upon *Hou*, which is not analogous art. *See infra* Section IV.A.1. The '539 Patent is directed to the field of a local coaxial network, while *Hou* describes network communications between a CM and CMTS. Additionally, the '539 Patent is directed to improving communication between nodes on a LAN using existing coaxial cabling in a building, while *Hou* is directed towards improving the then-current DOCSIS standard. Accordingly, *Hou* is not analogous art.

Second, the Petition relies on references that describe different networks than the network claimed in the '539 Patent. *See infra* Section IV.A.2.a. The '539 Patent describes and claims a local area network. By contrast, both *Hou* and *Konschak*

describe wide area networks, whether between a CMTS and a group of CMs (*Hou*) or as part of a wireless, radio frequency telecommunication network (*Konschak*). The Petition argues that *Hou*'s CM-CMTS structure is equivalent to the modem-node structure. Such disclosure is insufficient insofar as at least the node across at least one channel of a coaxial network of Claim 1.

Third, the Petition mischaracterizes the disclosures of *Hou*. See *infra* Section IV.A.2.b. *Hou*'s CMTS maintains performance statistics of each CM and does so independent from any prompting from the CM. Moreover, *Hou* does not disclose using a probe packet to obtain the performance statistics. Still, the Petition incorrectly alleges, without support in the prior art, that these measurements are performed through a "ranging protocol." But this is contrary to the disclosures of *Hou*, which refers to a "ranging protocol" as used ***only in the background*** (i.e., the prior art to *Hou*) and never describes its use in the CMTS-CM system of *Hou* itself. The Petition never explains why a POSITA would combine *Hou*'s invention with the prior art techniques that *Hou* chose not to use. Not only does the Petition contradict the actual teachings of *Hou*, but the Petition also relies heavily on references that are not actually part of the Petitioned Grounds. The Petition eschews a proper obviousness analysis by taking *Hou*'s background discussion of a prior art "ranging" protocol and then "combining" it with a reference (*Min*) describing one

such protocol—all without providing any actual proposed combination or motivation for combining *Hou* and *Min*.

Fourth, the Petition’s proposed combination fails to provide a reasonable expectation of success in modifying *Hou* to include OFDM techniques, which the Petition admits is a necessary step in its combination. *See infra* Section IV.A.3.a. To the contrary, *Hou* requires DOCSIS compliance—a fact the Petition both admits and repeatedly uses to support its arguments. But incorporating OFDM into *Hou*’s system would render *Hou* non-compliant with DOCSIS because DOCSIS did not support OFDM communication until 2013—over a decade after *Hou*’s filing date and nearly a decade after the priority date of the ’539 Patent.

Fifth, the Petition fails to prove that a POSITA would be motivated to modify *Hou* to include OFDM techniques due to multipath effects and it fails to provide any evidence that it was known at the time of filing the ’539 Patent that systems resembling *Hou* would be improved by OFDM. *See infra* Sections IV.A.3.b-IV.A.3.c

Sixth, the Petition does not provide adequate support for integrating the wireless system of *Konschak* into the wired system of *Hou*. *See infra* Section IV.A.3.d. *Konschak* utilizes OFDM techniques but never articulates any advantage of them over other techniques and never provides any reason to use them in a wired,

wide-area cable network system. *Konschak* is directed towards solving problems specifically found in wireless telecommunication systems, and a POSITA would not look to *Konschak* to improve systems like that described in *Hou*.

Lastly, the Petition relies on *Hou* and *Konschak*, without any suggestion that they would teach a system that applies to a coaxial channel of a LAN. *See infra* Section IV.A.3.e. Accordingly, a POSITA would not be motivated to combine *Hou* and *Konschak* to result in the modem of Claim 1 without improper reliance on hindsight.

In short, the Petition starts with a base reference directed towards a wide-area cable system that has nothing to do with the local communication of the '539 Patent, and then combines the base reference with a wireless system and modulation scheme (OFDM) that renders the base reference non-compliant with the standard it aims to improve. No POSITA would have pursued such a combination.

Making matters worse, the Petition then relies upon teachings from prior art references not actually part of any Ground of unpatentability, without performing any obviousness analysis, a practice that is at odds with the rules governing this proceeding. *See* 37 CFR 42.104(b)(2) (the Petition must identify “[t]he specific statutory grounds under 35 U.S.C. 102 or 103 on which the challenge to the claim is based and *the patents or printed publications relied upon for each ground*”). This

tortured combination is the epitome of improper hindsight. Accordingly, the Petition should be denied.

A. Ground 1: The Petition Fails to Establish that Claim 1 Would Have Been Obvious Over *Hou* and *Konschak* and the General Knowledge of a POSITA

Ground 1 alleges that Claim 1 is obvious over the combination of *Hou* and *Konschak*. “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 for three reasons: (1) the Petition relies upon *Hou* which is not analogous art; (2) the combination fails to disclose each claimed aspect to arrive at a workable solution; and (3) the proffered motivation to combine is insufficient.

1. The Petition Fails to Demonstrate that *Hou* is Analogous Art

The Petition relies on *Hou* for both Grounds 1 and 2, but the Petition fails to prove that *Hou* 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.* at 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 (PTAB 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) be 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 fails to prove that *Hou* is analogous under either prong. Whereas the ’539 Patent’s field is local area broadband coaxial cable networks (Ex. 1001, Title, 1:21-25), *Hou*’s modification to communications between the CMTS and CM is far afield from the broadband local area networks of the ’539 Patent. *See infra* Section IV.A.1.a. And whereas the ’539 Patent is directed towards optimizing communications on preexisting coaxial cables within a building based on the node delay spread on the network, *Hou* is directed towards increasing physical layer flexibility through the CMTS assigning burst profiles to CMs according to the CMs’ burst profile and robustness level to improve the DOCSIS standard. *See infra* Section IV.A.1.b.

Because both of the Petition’s grounds rely upon non-analogous art (*Hou*), they must be rejected.

- a. *Hou* does not fall within the same field of endeavor as the ’539 Patent

The ’539 Patent and *Hou* do not share the same field of endeavor. The ’539 Patent’s field of endeavor—as confirmed by its title, abstract, field of invention, figures, written description, and claims—is a local area broadband coaxial cable network. *Hou*, by contrast, is directed towards a communication system between the CM and CMTS, not the local area broadband coaxial networks that are the subject of the ’539 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.⁵ 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

⁵ See, e.g., *In re Wood*, 599 F.2d 1032, 1036 (CCPA 1979) (determining field of endeavor based on “Background of Invention”); *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.”).

1380-81 (affirming Board’s finding of field of endeavor based on “the title of the [] patent and the preamble of a ... claim”); *In re Bigio*, 381 F.3d 1320, 1326 (Fed. Cir. 2004).

Here, each of the traditional sources of identifying a field of endeavor confirm that the ’539 Patent’s field is local area broadband coaxial cable networks. The ’539 Patent’s title concerns “Physical Layer Transmitter for Use in a **Broadband Local Area Network**.” Ex. 1001, Title. The abstract notes “The physical layer transmitter allows node-to-node communication within a **broadband cable network** and each node in the network is capable of communicating with every other node in the network.” *Id.*, Abstract. The ’539 Patent’s “field of invention” identifies “broadband communications networks and in particular to **broadband communication networks utilizing coaxial cable**.” *Id.*, 1:20-23. The Background of the Invention similarly focuses on local area broadband coaxial cable networks. *Id.*, 1:43-56, 2:4-27, Fig. 1, Fig. 2. For example, the ’539 Patent considers problems often encountered on local coaxial cable networks. *Id.*, 1:43-56. The specification also describes “a known broadband cable system” that is “shown within a building[.]” *Id.*, 2:17-19. The ’539 Patent further describes a need to connect CPEs on a local network within a building that utilizes an existing coaxial cable network. *Id.*, 4:26-33. This is consistent with Claim 1 of the ’539 Patent, which concerns a

“modem for communication to at least one node across at least one channel of a coaxial network.” *Id.*, Cl. 1.

Hou’s field is not a local area broadband coaxial network utilizing coaxial cable. Instead, *Hou*’s field is described as relating to “cable modem systems,” and more specifically is directed towards communications where “signals are transmitted upstream from a cable modem (CM) to a cable modem termination unit (CMTS) when the subscriber desires to communicate with the headend.” Ex. 1005, Abstract; *see also id.*, 1:22-25 (“In the conventional cable modem system, a headend 2 is connected to multiple subscribers 12 (residence or business) via an access network 6 such as coaxial cable, Hybrid Fiber Coax (HFC), or wireless.”). *Hou*’s cable modem system is depicted in Figure 1 (reproduced below), which shows network communications between the CMTS 4 at a cable headend 2 (located outside a subscriber’s home 12) and one or more cable modems 14 located at each of the various subscribers’ homes 12:

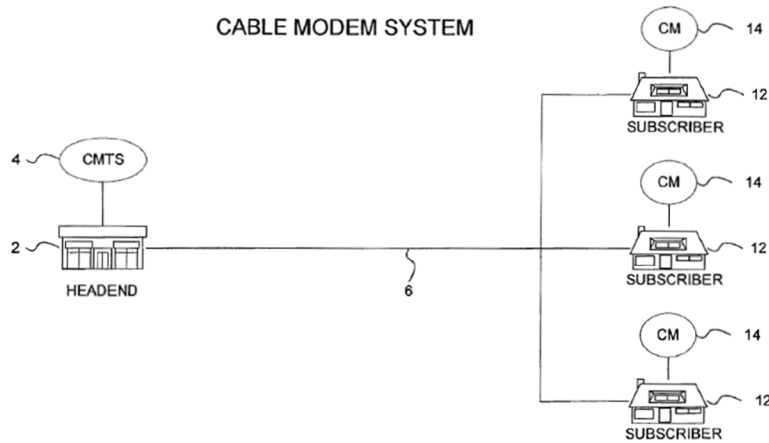


FIG. 1 (PRIOR ART)

Ex. 1005, Fig. 1, 1:29-34. While *Hou* describes a modem, it does so in the context of the communications external to the home and does not provide any description related to any local area communication at all. In fact, the only communications discussed in *Hou* are between the CMTS and the CM. *See e.g.*, Ex. 1005, Abstract (“The invention described herein is directed to a method and apparatus for increasing the communication channel between the CM and the CMTS”). Consequently, *Hou* is not directed to a local area broadband coaxial network like the ’539 Patent.

The Petition asserts “*Hou* is analogous art to the ’539 Patent because both *Hou* and the ’539 Patent are from the same field of endeavor—*Hou* is directed to improving the communications in a coaxial cable modem network[.]” Petition, 23-24. The Petition is overly generic with this “identification” and fails to acknowledge that the cable modem system of *Hou* is outward looking, between the CMTS and

CM, and not inward looking within a LAN. Ex. 1005, Abstract, 1:21-25. Rather than find technology that applies on a local area broadband coaxial network, the Petition relies on use of a modem, but ignores the remaining teachings of the reference. The Petition’s approach of identifying 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. 966 F.2d at 657-60. There, a finding of analogous art as “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. *Id.*

As to the field-of-end endeavor test, the court in *Clay* 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.* at 659 (italicization in original). Thus, the “storage” and “extraction” of oil are two separate

fields. *See also Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 864-65 (Fed. Cir. 1993) (same analysis for other fields of art).

Accordingly, it would be improper to describe the '539 Patent and *Hou* as falling within the same (overly broad) field of endeavor of modems communicated over coaxial cabling. Rather, the '539 Patent (local area broadband coaxial network I) and *Hou* (CM-CMTS communications network) do not share the same field of endeavor.

b. *Hou* is not reasonably pertinent to the particular problem of the '539 Patent

Hou is not reasonably pertinent to the particular problem the inventors of the '539 Patent were trying to solve. The Petition provides no basis to conclude that *Hou* is reasonably pertinent, only arguing (incorrectly) that *Hou* falls within the same field of endeavor as the '539 Patent. Petition, 23-24.

The '539 Patent is directed to optimizing communications in a LAN utilizing existing broadband local area communication networks utilizing coaxial cable. Ex. 1001, 4:26-33. For example, the '539 Patent describes using an EP probe to measure the node delay spread on the network to optimize the preamble and cyclic prefix requirements or other parameters. *Id.*, 9:62-65, 10:30-37, 5:17-31, Cl. 1. This optimization is done to account for multipath effects that arise in local networks

when attempting to communicate through the output ports of splitters. *Id.*, 3:38-61, 14:11-15.

In contrast, *Hou* is directed to improving CM to CMTS communication. It is directed to communication using the DOCSIS standard, a standard absent from the '539 Patent. Ex. 1005, 5:46-51. *Hou* proposes modifying the standard by enabling the CMTS to assign burst profiles and a number of mini-slots to each CM according to the CMs' robustness level. *Id.*, 5:52-6:6. None of this CM-CMTS communication occurs between the output ports of splitters, and it is not pertinent to the problem faced by the '539 Patent.

Thus, the Petition fails to demonstrate that *Hou* is analogous art to the '539 Patent, and consequently, all of the Petition's grounds fail.

2. The Proposed Combination of *Hou* and *Konschak* Fails to Teach all Aspects of the Claims

The combination of *Hou* and *Konschak* fails to disclose all aspects of Claim 1 of the '539 Patent. **First**, the combination, which itself is improper for the reasons set forth below in Section IV.A.3, fails to teach the claimed pathway across which the modem communicates with the node. **Second**, the Petition fails to identify any teaching of a MAC layer using a probe packet that measures node delay spread to optimize parameters of the transmission.

- a. The Petition fails to identify a claimed “at least one node across at least one channel of a coaxial network” in the *Hou-Konschak* combination

The Petition fundamentally mischaracterizes structural aspects of Claim 1 of the '539 Patent. Taking Claim 1 of the '539 Patent in light of its plain meaning, a POSITA would understand that “at least one node” refers to a terminal in a coaxial network. A POSITA would recognize that the CMTS-CM structure of *Hou* does not disclose “at least one node across at least one channel of a coaxial network,” and accordingly, the structure of the proposed combination, is fundamentally different than the modem-node channel structure provided in the '539 Patent.

The '539 Patent claims “at least one node across at least one channel of a coaxial network[.]” Ex. 1001, Cl. 1. The preamble of Claim 1 is limiting because it provides antecedent basis to the network claimed in the body of the claim. *Id.* Claims must be interpreted consistent with the specification and correspond with what and how the inventor describes the invention within the specification. *In re Smith Int'l Inc.*, 871 F.3d 1375, 1382-1383 (Fed. Cir. 2017) (citation omitted). Reading the claims in light of the '539 Patent's specification, the node of Claim 1 is a node on a local coaxial network.

As described in the specification, a node is connected to or comprises terminals in a local network. *See* Ex. 1001, 1:37-46, 4:26-30. The '539 Patent

consistently describes the nodes as “terminals” within a *local* area network, and never as part of a wide area network. *See e.g.*, Ex. 1001, 1:37-42 (“Generally, these broadband cable splitters distribute down-stream signals from the POE to various *terminals (also known as ‘nodes’) in the building*. The nodes may be connected to various types of Customer Premises Equipment (“CPEs”) such as cable converter boxes, televisions, video monitors, cable modems, cable phones, and video game consoles.”), 4:26-30 (“Therefore, there is a need for a system and method to connect a variety of CPEs into a local network, such as a local area network (‘LAN’), within a building such as a home or office, while utilizing an existing coaxial cable network within the building.”).

Hou does not disclose “at least one node across at least one channel of a coaxial network[.]” The CMTS of *Hou* is not a node across a channel of the coaxial network as the term is understood in the ’539 Patent. As depicted in Figure 1 below, *Hou* describes network communications between the CMTS 4 at a cable headend 2 (located outside a subscriber’s home 12) and one or more cable modems 14 located at each of the various subscribers’ homes 12:

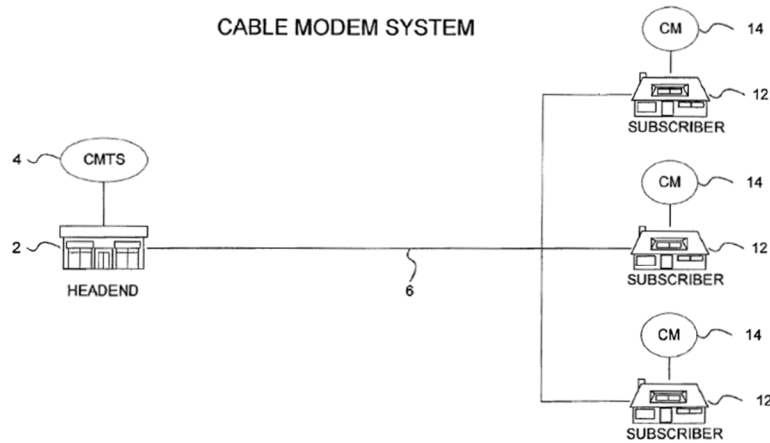


FIG. 1 (PRIOR ART)

Ex. 1005, Fig. 1, 1:29-34.

In a flawed attempt to overcome the structural differences between the claims of the '539 Patent and *Hou*, the Petition alleges that the “the CM in *Hou*’s network is a ‘modem’ for communicating with the CMTS (the claimed ‘node’) across the channel between the CM and CMTS.” Petition, 28.

The CMTS is decidedly outside the premises, on a broader wide area network separate and apart from any local area network. The CMTS is also not a node because it is not a terminal on a local network, such as a cable converter box. So, *Hou* describes a fundamentally different channel than the “at least one node across at least one channel of a coaxial network” that is described in the '539 Patent.

The Petition also does not rely on *Konschak* with respect to this limitation. See Petition, 26-28. Nor can it: *Konschak* describes a wireless communications

network associated with metropolitan areas. *See* Ex. 1006, [0002]. This network is similarly a wide area network, extending well beyond a premises. This network is also a wireless network using mobile stations or base stations as communication apparatuses, rather than a modem and node on a coaxial network. *Id.*, [0021]. Accordingly, the Petition’s proposed combination fails to identify any instance of the claimed “at least one node across at least one channel of a coaxial network[.]”

- b. The Petition fails to show a MAC Layer “using at least one probe packet . . . to measure node delay spread”

The Petition relies on *Hou* to disclose “the MAC layer using at least one probe packet as an echo profile probe to measure node delay spread on the network[.]” *See* Petition, 33-37. The Petition’s argument mischaracterizes the operation of *Hou* with respect to *Hou*’s measured performance statistics.

The Petition alleges that using a probe packet to take measurements (including node delay spread) is rendered obvious by *Hou*’s ranging protocol. Petition, 35. This argument fails for two reasons: (1) the ranging protocol mentioned in *Hou* is background material and is not used to measure *Hou*’s performance metrics, and (2) the “time delay” measured by this prior art protocol is not a delay spread.

- i. *Hou* does not use a ranging protocol to measure delay spread

The Petition erroneously assumes that the “ranging protocol” in *Hou*’s background discussion is part of *Hou*’s system for measuring performance metrics. Petition, 35. The Petition is mistaken. The “ranging protocol” is mentioned only briefly in *Hou*’s background section and never appears in *Hou*’s discussion of its method for measuring metrics.

Hou discloses that its CMTS measures metrics, but without reference to any ranging protocol or request. *See* Ex. 1005, 6:35-36 (“First, the CMTS maintains the performance statistics of each CM.”), Fig. 5 (first step of method is CMTS maintains statistics). In *Hou*, the CMTS maintains performance statistics of each CM (*see id.*, 7:13-14), but there is no indication that these statistics are obtained through the ranging procedure. The CMTS maintains performance statistics before any prompting of the CM. *Id.* The CMTS already maintains the performance statistics, in advance of any instance of the CM performing a bandwidth request. *Id.*, 7:13-26, Fig. 5. As part of the bandwidth request by the CM, the CMTS determines if the CM is even capable of dynamic burst profile mode, and if so, the CMTS can assign a burst profile to the CM based on the already performed performance measurements. *Id.* A POSITA would not find this to disclose the MAC layer (of a modem) “using at least one probe packet . . . to measure node delay spread[.]”

In fact, the Petition itself acknowledges that *Hou* does not disclose using probe packets or ranging procedure to maintain the performance statistics. Petition, 36 (“While Hou conducts ‘performance measurements’ on CMs’ transmissions, it does not expressly disclose conducting these measurements using ‘probe packets[.]’”). *Hou* discusses the CMTS performing measurements by analyzing upstream transmissions from CMs using identical burst profiles. Ex. 1005, 8:43-45.

Despite the admitted shortcoming, the Petition nevertheless concludes, divorced from any teaching in *Hou*, that this analysis is part of a ranging procedure. *Hou* does not provide a basis to assume that this analysis is part of a ranging procedure. See Petition, 36; Ex. 1003, ¶ 107. To the contrary, *Hou* distinguishes its method from “the problems of the prior art,” and the prior art used a ranging protocol. Ex. 1005, 6:29-45.

The Expert Declaration attempts to identify an alleged “implementation” of *Hou* that is simply not found within *Hou*. Ex. 1003, ¶ 107 (“It would have been obvious to a POSITA that the RNG-REQ messages exchanged during typical ranging protocols, as disclosed in *Hou*, would have been transmitted using a burst profile—presumably corresponding to ranging burst types—and would have been used to measure the parameters used by Hou’s CMTS to assign burst profiles to the CMs.”), ¶ 110 (“it would have been obvious to *implement* those measurements

[Echo Delay Spread] using the existing ranging messages[.]”). These statements themselves indicate that using the RNG-REQ to measure Echo Delay Spread is not found within *Hou*’s disclosure. *At best*, the ranging protocol and the RNG-REQ message is used to request information obtained by the CMTS prior to a CM requesting bandwidth, not to measure the performance statistics with the RNG-REQ message. Accordingly, the Petition fails to show *Hou* discloses a probe packet used to measure node delay spread.

The Petition also substantially and inappropriately relies on the ranging protocol to relate the MAC layer of a CM with respect to using the probe packet to measure Echo Delay Spread. *See e.g.*, Petition, 42 (“In fact, in the DOCSIS ranging protocol, synchronization between the CMTS and CM using an ‘Upstream Channel Descriptor MAC management message’ was a requirement.”) (emphasis removed). However, this too is a teaching not found in *Hou* and, as discussed below (*see infra* Section IV.A.3.a), compliance with DOCSIS is a key reason why a POSITA would not pursue the alleged combination in the first instance. Accordingly, the Petition fails to render obvious the MAC layer using at least one probe packet.

To the extent the Petition implicitly proposes modifications to *Hou*, the Petition is insufficient as it lacks a basis to make such a modification. Such motivation is also not found within any of the references relied upon by the Petition.

The only reason to interpret or modify *Hou* this way is based on hindsight, using the '539 Patent to reconstruct the claim. Therefore, the Petition is either misinterpreting *Hou*, or else implicitly proposing a modification without any support within the Petition for doing so.

- ii. The ranging protocol does not teach “using a probe packet as an echo probe to measure node delay spread on the network”

Even if the “ranging protocol” in *Hou*’s background were assumed to be part of *Hou*’s system, the Petition still errs in relying on that protocol. The ranging procedure described as background in *Hou* is used to measure a time delay between the CMTS and the CM. Ex. 1005, 2:58-62. The time delay measured through the ranging protocol compensates for the greatly varying distances between the CMTS and individual CMs. *Id.*, 2:58-60. The time delay is then communicated from the CMTS to the CM as a small positive or negative correction value. *Id.*, 2:64-66.

This time delay is ***not*** the Echo Delay Spread on which the Petition relies for Ground 1. *See* Petition, 34. The performance statistic maintained by the CMTS is “Echo Delay Spread (measurement of Amplitude of echo and its delay).” Ex. 1005, 13:1-14. These are distinct metrics measured in different ways. The former is a measurement of delay in transmission time between CMTS and CM, as measured by the ranging protocol of the prior art. The latter is a measurement of the ***spread*** in

delay, as tracked by the CMTS without use of any ranging protocol. The Petition improperly merges two distinct parts of *Hou*—the background ranging protocol for time delay and the CMTS metric tracking for echo delay spread—and thus fails to show that *Hou* discloses measurement of echo delay spread using a ranging protocol.

Further, the Petition provides no actual evidence that Echo Delay Spread *can* be or has been measured by a ranging protocol. The ranging protocol referenced in *Hou* is a prior art process used for two purposes. **First**, the ranging protocol is used to measure time delay and inform the CM of necessary corrections to its local clock due to the distances between the CMTS and CM. *Id.*, 2:58-66. **Second**, the ranging protocol is used to cause the CMs to transmit at a power level that ensures all upstream bursts from the CMs arrive at the CMTS at the same power level. *Id.*, 2:66-3:3. There is no description with respect to the ranging protocol that indicates it measures Echo Delay Spread.

The Petition does not rely on *Konschak* to remedy this deficiency of *Hou*. Rather, the Petition attempts to “enhance” *Hou*’s ranging procedure to obtain benefits allegedly disclosed in *Konschak* by implementing *Konschak*’s teachings. As discussed below, this “enhancement” would not actually be made. Therefore, the *Hou-Konschak* combination, even if proper, fails to disclose all elements of Claim 1.

3. The Petition Provides Insufficient Basis to Combine the Cited
References to Arrive at the Claimed Invention.

Hou and *Konschak* operate in disparate settings that make their combination impractical and inconsistent, such that they would not be combined—absent the Petition’s hindsight—to arrive at the claims of the ’539 Patent. The Petition fails in that it does not address significant challenges involved in implementing the *Hou-Konschak* combination and relies on conclusory and insufficient motivation not apparent to a POSITA.

A POSITA would not consider modifying *Hou* with the teachings of *Konschak* for multiple reasons. **First**, *Hou* does not utilize OFDM techniques and cannot maintain its DOCSIS compliance (a fact relied upon by the Petition) if modified to utilize OFDM techniques. A POSITA could not implement changes from *Konschak* (an OFDM system) into *Hou* without rendering *Hou* inoperable for one of its intended purposes (DOCSIS compliance). **Second**, the Petition’s allegations that *Hou* is concerned with multipath effects is not adequately supported by *Hou*’s disclosure. **Third**, the Petition provides no evidence to support that OFDM techniques would improve *Hou*, even if *Hou* were concerned with multipath effects. **Fourth**, even if a POSITA could implement OFDM into *Hou*, a POSITA would not be motivated to include the teachings of *Konschak*’s wireless system into *Hou*. **Fifth**, such a combination, even if made, would not resemble the system of Claim 1.

- a. *Hou* cannot be modified to include OFDM techniques with a reasonable expectation of success

In advancing the *Hou-Konschak* combination, the Petition argues that OFDM communications (such as that of *Konschak*) would be implemented in *Hou*'s system. Petition, 15. The Petition provides no argument why a POSITA would have a reasonable expectation of success implementing OFDM techniques into *Hou*. See Petition, 23-26. Further, a POSITA would have no reasonable expectation of success in making this proposed modification, as it would frustrate *Hou*'s teaching of DOCSIS compliance.

As noted in the Petition, *Hou*'s system must be a DOCSIS compliant system. Petition, 11; Ex. 1005, 9:7-9. The Petition relies on DOCSIS compliance throughout the Petition to: (1) allege the compatibility of *Hou*'s wired network with the teachings of *Konschak*'s wireless network; (2) bolster *Hou*'s disclosure of ranging (and a POSITA's understanding thereof); and (3) relate the combination to the MAC layer that is otherwise not disclosed with respect to the claim limitations. Petition, 22, 35, 37, 41-42, 61.

However, implementing OFDM modulation into a DOCSIS compliant system as of the filing date would frustrate compliance with the DOCSIS standard and would not be within the knowledge of a POSITA. *Hou* is compatible with and describes a DOCSIS 1.0/1.1 system. Ex. 1005, 4:10-13. DOCSIS 1.0/1.1 did not

use OFDM techniques. *See, e.g.*, Ex. 1029, 27 (Explaining DOCSIS 1.0 systems utilize TDMA with QPSK and 16 QAM modulation formats in the upstream direction.). Rather, the DOCSIS 1.0/1.1 utilizes single-carrier modulation with QPSK or 16QAM carriers. Ex. 1005, 3:8-10 (“The modulation forms are QPSK (2 bits per symbol) and 16-QAM (4 bits per symbol)”); Ex. 1029, 27.

In 2004, the year to which the ’539 Patent claims priority, DOCSIS 2.0 was standard. However, OFDM was not introduced into the DOCSIS standard until DOCSIS 3.1, which was released in 2013. Ex. 2001 (U.S. Patent Publication No. 2017/0180176), [0003] (“The Data Over Cable Service Interface Specification (DOCSIS) 3.1 specifications were developed and issued in 2013.”) [0004] (“DOCSIS 3.1 extends the spectrum by using, in part, a modern PHY technology (i.e. Orthogonal Frequency Division Multiplexing (OFDM))[.]”). By implementing OFDM modulation onto *Hou*’s system, *Hou* would no longer be DOCSIS compliant as of the ’539 Patent’s priority date.

Additionally, the Petition does not even contemplate additional alterations necessary to *Hou*’s system to implement OFDM. For example, *Hou* would require transmitters and receivers of performing Fast Fourier Transforms (FFT) and Inverse Fast Fourier Transforms (IFFT). *See e.g.*, Ex. 1032, 2, Fig. 2. These FFT and IFFT processes would add additional complexity to the system of *Hou*, which would likely

require additional hardware capabilities, especially in light of the DOCSIS technology at the time of the '539 Patent. Contrary to the Petition's allegations regarding the combination, a POSITA would not have modified *Hou*'s system to be OFDM compatible because it could not have been modified while maintaining DOCSIS compliance.

Konschak discloses nothing to solve the problem with loss of DOCSIS compliance. *Konschak* describes an OFDM system in the wireless context and offers no teachings at all about how to implement it in a coaxial network, let alone a network that relies on DOCSIS compliance. *See* Ex. 1006, [0002]. A POSITA would not have looked to *Konschak* at all, let alone been motivated to modify *Hou* to implement an OFDM system like *Konschak* into *Hou*'s TDMA system.

Accordingly, the Petition fails on this basis alone.

b. The Petition's multipath allegation is not rooted in *Hou*

The Petition alleges that a POSITA would find it obvious to implement OFDM into *Hou* due to concerns over multipath effects. *See* Petition, 16-17. To the contrary, *Hou* does not even contemplate multipath effects. To allege that *Hou* is concerned with multipath effects, the Petition relies heavily upon *Hou*'s single mention of "Echo Delay Spread" as relating to multipath effects. The Petition then relies on this improper interpretation as providing a motivation to combine. *See id.*,

16-17. However, the brief passage of *Hou* does not indicate any concern with multipath delay spread or suggest multipath usage at all. Ex. 1005, 13:1-14 (“The CMTS should be capable of measuring the following counts on a per CM basis in order to determine appropriate burst profiles to assign: ... Echo Delay Spread (measurement of Amplitude of echo and its delay).”); Ex. 1003, ¶ 67 (“*Hou* does not explain the term in detail”). Given *Hou*’s limited disclosure and conclusory description of “amplitude of echo and its delay” (*see* Ex. 1005, 13:1-14), there is no basis to conclude that *Hou*’s system shows a concern with multipath effects.

Further, neither the Petition nor the expert declaration make reference to systems that resemble *Hou* or show that multipath effects is an issue for communications between a CMTS and a CM over a coaxial or fiber optic cable like that of *Hou*. *See*, Ex. 1003, ¶¶ 67-68. For example, Petitioner’s declarant states “systems such as that disclosed in *Hou* were known environments where multipath effects were a known problem in communications” but cites to a reference, *Raissinia*⁶, that deals with and advocates for **wireless communications systems**. Ex. 1003, ¶ 67; Ex. 1010, 3:56-58 (“FIG. 1 depicts a point to multipoint **wireless** communication network 100 suitable for implementing one embodiment of the

⁶ US 7,230,909 (Ex. 1010).

present invention.”). Additionally, *Raissinia* states, “[i]t is desirable to use OFDM in point to multipoint networks where multipath effects are a concern[,]” but it never states that a **wired** network like in *Hou* is a network where such affects are a concern. Ex. 1010, 4:30-32.

In sum, the Petition alleges motivation to modify *Hou* (1) based on a single sentence in its disclosure that does not even mention multipath effects and (2) by reference to prior art that deals with wireless networks, not a wired network like *Hou*. Such motivation is conclusory and lacks support, and a POSITA would not consider making such a wholesale modification to the *Hou* system.

- c. The Petition does not provide evidence to conclude OFDM would remedy issues with multipath effects on a wired network like *Hou*

The Petition also broadly and insufficiently alleges use of OFDM techniques to improve “systems like Hou’s[.]” Petition, 16. As discussed, the Petition relies on *Raissinia*, which deals with wireless systems. Ex. 1003, ¶ 67; Ex. 1010, 3:56-58. The other cited references also fail to provide a comparable system. *See* Ex. 1011, 3:62-63 (“OFDM possesses inherent advantages for wireless communications.”); Ex. 1012, 1:16-17 (“This invention relates generally to wireless telecommunications”). So, the Petition fails to provide a single prior art reference that employs OFDM communication on a coaxial or fiber optic cable between a CM

and CMTS (like *Hou*) to counteract problems faced on such networks. Ex. 1005, 1:39-42; Ex. 1010, 3:56-58; Ex. 1011, 3:62-63; Ex. 1012, 1:16-17. Nor does the Petition cite any prior art teaching regarding the use of OFDM in the field of the '539 Patent (local area broadband coaxial cable networks).

Similarly, nothing in *Konschak* suggests OFDM is superior for coaxial transmission, as *Konschak* describes only wireless systems. See Ex. 1006, [0001]. *Hou* suggests no deficiencies in the modulation employed in DOCSIS 1.0/1.1, but instead proposes a modification of existing DOCSIS structures without making any radical changes in modulation techniques. See Ex. 1005, Abstract, 4:7-13. So, the Petition's argument is insufficient to illustrate why a POSITA would implement OFDM in a *coaxial* network between a CM and CMTS as the Petition alleges with respect to *Hou*.

- d. A POSITA Would Not Consider Combining *Hou* and *Konschak* due to *Konschak*'s limited application to wireless embodiments

Further still, a POSITA would not consider implementing the teachings of *Konschak* into *Hou*. The Petition asserts that *Hou* addresses both wired and wireless communication. See, Petition, 22. In reality, *Hou*'s Background section includes a single, isolated reference to a headend communicating to multiple subscribers over a wireless network when describing the technological background. Ex. 1005, 1:22-

25. *Hou* provides no further description of how a wireless embodiment would function, much less include a wireless embodiment. Instead, *Hou* is entirely focused on a wired system. Ex. 1005, 1:29-53. *Hou* does not provide any disclosure to enable a wireless embodiment.

In contrast, *Konschak* is focused on issues encountered in **wireless systems** alone. *Konschak* is directed to a transmitting symbol separated by a cyclic extension on a wireless communication system such as a radio frequency telecommunication system. Ex. 1006, [0001]. *Konschak* attempts to limit unnecessary overhead caused by the cyclic extension while maintaining transmission quality by determining the delay of the communications channel. *Id.*, [0006]-[0007], [0009]. *Konschak* describes wireless, not wired communication networks, and is completely silent with regard to any local broadband coaxial network. *Id.*, [0021] (“The communication apparatus 9 shown in figure 4 can for example be a mobile station or base station of a **wireless** OFDM telecommunication system.”), [0007] (“The object of the present invention is therefore to provide a communication apparatus and a communication method for transmitting and receiving information as OFDM-symbols in a **wireless telecommunication system**”). *Konschak* is focused on remedying issues encountered on wireless communications systems, like buildings that disturb signal quality. *See, id.*, [0002].

A POSITA would not be motivated to incorporate teachings of *Konschak* into *Hou*'s system because the changes would not aid the wired system described in *Hou*. A POSITA would have no reason to modify *Hou* given its wired embodiment.

- e. A *Hou-Konschak* combination would not render obvious the Claimed invention

Even if the systems disclosed in *Hou* and *Konschak* could be combined, the combination does not suggest the claimed modem.

First, a POSITA would not combine *Hou* and *Konschak* to be implemented on a wired connection over a LAN. *Konschak*'s system addresses problems encountered on a wireless channel due to the environment like reflection, absorption, and refraction. *See id.*, [0002]. Transmission of signals over wireless communication apparatuses strongly depends on respective environments. *Id.* Cable networks at a subscriber's premises that use coaxial cable are shielded and insulated; such a network would not be impacted or disturbed by the environment to the same degree as a wireless communication network so a POSITA would not be motivated to implement *Konschak*'s teachings. Thus, if a POSITA were to consider any *Hou-Konschak* combination, it would embody a wireless telecommunications system, not a wired telecommunications system.

Second, neither reference includes teachings that would reasonably be applied to a LAN. As discussed, Claim 1 relates to a coaxial communications on a LAN.

See supra Section IV.A.2.a. *Konschak* describes a wireless network in a metropolitan area. Ex. 1006, [0002]; *see supra* Section III.B. There is nothing in its disclosure to suggest applying it in a cabled LAN.

The same can be said with respect to *Hou*. As noted, *Hou* describes communications between a CMTS and CM and fails to describe the structure of Claim 1. *See supra* Section IV.A.1.a. The ranging procedure described as background in *Hou* is used to measure a time delay and compensate for physical distance between a CM and a CMTS. Ex. 1005, 2:58-62. The physical distance between a CM and a CMTS “can vary greatly” and result in time delays “in the millisecond range,” whereas the distance between a modem and a given node in the local network of the ’539 Patent will not vary much (and the time delays will be much shorter) because all devices on the network are within meters or tens of meters of each other. *See* Ex. 1001, 1:37-39 (“Generally, these broadband cable splitters distribute downstream signals from the POE to various terminals (also known as ‘nodes’) in the building.”). Thus, the wide area network of *Hou* involves vastly different distances than those encountered in the local network of the ’539 Patent. Despite this, the Petition inappropriately applies the ranging procedure discussed in the background of *Hou* to attempt to reconstruct Claim 1 through hindsight. *See supra* Section IV.A.2.b.ii.

Accordingly, nothing described in *Hou* and *Konschak* would motivate a POSITA to implement their teachings on a coaxial channel of a LAN. Therefore, the Petition fails to provide an adequate motivation to combine the cited references to achieve the Claimed Invention.

B. Ground 2: The Petition Fails to Establish that Claims 2-7 Would Have Been Obvious Over *Hou*, *Konschak*, *Dapper*, and the General Knowledge of a POSITA

As described above, the Petition fails to articulate a motivation to combine *Hou* and *Konschak*. The Petition does not rely on *Dapper* to illustrate a motivation to combine *Hou* and *Konschak* or for any of the elements discussed above. Moreover, the Petition does not rely on *Dapper* to address any element of independent Claim 1, the sole independent claim of the '539 Patent. Accordingly, the inclusion of *Dapper* does not cure the above identified deficiencies of Ground 1 nor provide teachings that would render any Claims dependent on Claim 1 of the '539 Patent (Claims 2-7) obvious.

V. CONCLUSION

In view of the foregoing, the Petition fails to show that there is a reasonable likelihood that the Petition will prevail on a single Claim. Institution should be denied.

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

The undersigned hereby certifies that the foregoing contains 9,459 words according to the word count of the word-processing software used to prepare the foregoing.

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CERTIFICATE OF SERVICE

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