

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

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

v.

ENTROPIC COMMUNICATIONS, LLC,
Patent Owner.

IPR2024-00562
Patent 8,363,681 B2

Before LYNNE H. BROWNE, BARBARA A. PARVIS, and
FREDERICK C. LANEY, *Administrative Patent Judges*.

PARVIS, *Administrative Patent Judge*.

DECISION
Denying Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

DISH Network L.L.C., DISH Network Service L.L.C., DISH Network Corporation, and DISH Network California Service Corporation (collectively, “Petitioner”) filed a Petition (Paper 2 (“Pet.”)) requesting *inter partes* review of claims 1–40 (“challenged claims”) of U.S. Patent No. 8,363,681 B2 (Ex. 1001, “the ’681 patent”). Entropic Communications, LLC (“Patent Owner”) filed a Preliminary Response. Paper 8 (“Prelim. Resp.”).

Under 35 U.S.C. § 314(a), an *inter partes* review may not be instituted unless the information presented in the petition and any response “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” For the reasons provided below, we determine that Petitioner has not demonstrated a reasonable likelihood that it will prevail in showing the unpatentability of at least one challenged claim. Accordingly, we do not institute *inter partes* review of the ’681 patent.

II. BACKGROUND

A. *Real Parties-in-Interest*

Petitioner identifies DISH Network L.L.C., DISH Network Corporation, DISH Network Service L.L.C., and DISH Network California Service Corporation as the real parties-in-interest. Pet. 90. Patent Owner names itself as the real party-in-interest. Paper 4, 1.

B. *Related Matters*

Both parties identify the following district court proceeding involving assertion of patents against Petitioner: *Entropic Communications, LLC v. DISH Network Corporation et al.*, Case No. 2-23-cv-01043 (C.D. Cal.). Pet. 90–91; Ex. 1021; Paper 4, 1; Paper 7, 1. Patent Owner identifies the

following patents and application related to the '681 patent: U.S. Patent Application No. 12/579,312; U.S. Patent No. 8,320,566; and U.S. Patent No. 8,418,036. Paper 4, 2.

C. The '681 Patent

The '681 patent is titled “Method and Apparatus for Using Ranging Measurements in a Multimedia Home Network.” Ex. 1001, code (54). The '681 patent relates to “using ranging to improve network efficiency,” and in particular, “provid[ing] ranging to improve local clock time synchronization.” *Id.*, code (57). According to the '681 patent, “[r]anging is a method by which nodes measure and/or estimate the propagation delays to and from other nodes in the network.” *Id.* at 3:58–60.

By way of background, the '681 patent notes that “there is a growing demand for the ability to connect content devices (e.g., televisions, DVD players and recorders, digital cameras, speakers, video cameras, etc.), computing devices, I/O devices, home appliances and modems.” Ex. 1001, 1:36–40. According to the '681 patent,

[t]o address the growing demand for a digital home networking market, a consortium of industry leading companies formed the Multimedia over Coax Alliance (MoCA™). MoCA has provided a technical standard (referred to as “MoCA 1.0”) which defines a protocol for distributing digital entertainment over the available bandwidth on coaxial cable previously installed in households for cable or satellite TV service.

Id. at 1:59–66.

The '681 patent explains that “[t]he protocol established by MoCA includes a layered approach, in which the first layer is the physical (PHY) layer and the second layer is the Media Access Control (MAC) layer.” *Id.* at 2:32–35. The '681 patent further explains that

upon setting up a MoCA network, one of the client nodes is automatically selected to be a network coordinator (NC). The network coordinator (NC) is relied upon to schedule all traffic on the network, thereby allocating the network bandwidth and avoiding packet collisions. The NC communicates the schedule to each client node in “Media Access Packets” (MAPs), where each MAP is a packet of information.

Id. at 2:35–42. To facilitate the scheduling, “the NC and each node in the network maintains a local channel time clock (CTC) counter and all nodes are responsible for synchronizing their CTC counts to that of the NC.” *Id.* at 2:44–47. According to the ’681 patent, based on MoCA, inaccuracies to the CTC are introduced by, for example, delay in transmission, propagation delay, “i.e., time it takes for the NC’s packet to propagate through the medium to the receiver,” receive delay, i.e., “variances in the manner packet arrival time is estimated,” and clock drifts between nodes. *Id.* at 3:1–14.

The ’681 patent is directed to “systems, methods and apparatuses . . . for using ranging to improve network efficiency.” *Id.* at 3:54–56. The ’681 patent states that “for orthogonal frequency division multiple access (OFDMA) schemes, such as those used in MoCA standards, . . . it is desirable for all OFDMA packets to arrive at the OFDMA receiver at roughly the same time, otherwise network performance suffers with the need for longer cyclic prefix lengths to synchronize multiple OFDMA packets.” *Id.* at 3:66–4:5. According to the ’681 patent, “ranging results in clock synchronization that allows for substantially simultaneous arrival of OFDMA packets at the receiver, thereby reducing the cyclic prefix length needed.” *Id.* at 4:6–9. The ’681 patent describes “a method for synchronizing a plurality of nodes on a communication network,” comprising:

exchanging local clock times between a first node and a second node over the communication network; performing a ranging method between the first and second nodes based on the local clock times exchanged between the first and second nodes, wherein the ranging method results in an estimated propagation delay between the first and second nodes; and adjusting the local clock times of the one or both of the nodes based on the estimated propagation delay, thereby resulting in a synchronized local clock time at the first and second nodes.

Id. at 4:20–34.

Figure 9 of the '681 patent, reproduced below, illustrates an example of clock synchronization using maintenance synchronization and ranging in accordance with an embodiment of the disclosure. Ex. 1001, 9:21–23.

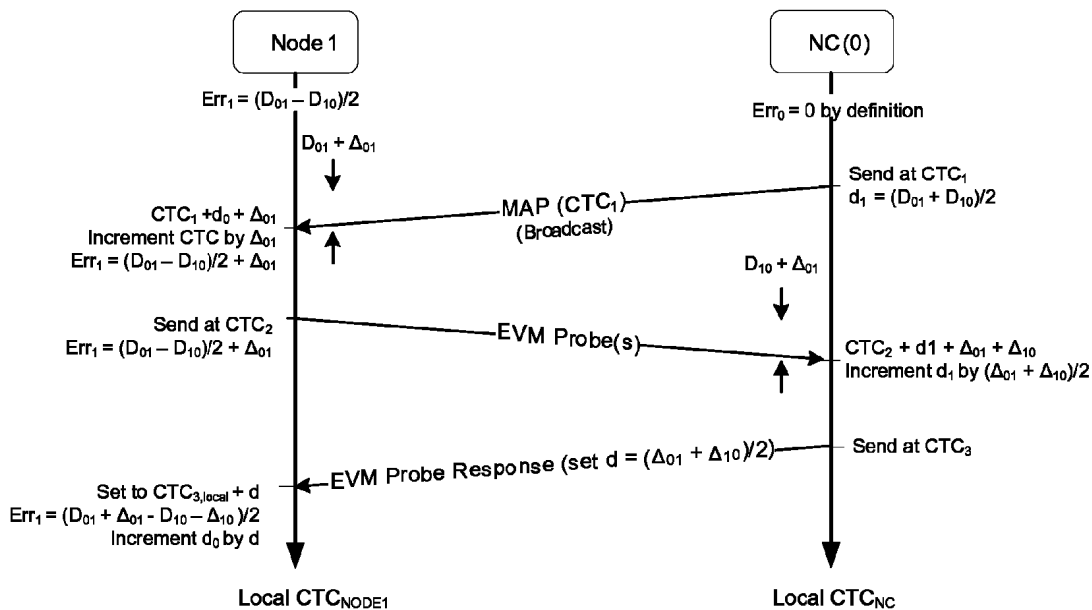


FIG. 9

According to the '681 patent, Figure 9 shows “a sequence of operations that a node must follow in order to track the propagation delay between itself and

the NC, as well to maintain CTC synchronization with the NC.” *Id.* at 9:27–31.

D. Illustrative Claim

Petitioner challenges claims 1–40 of the ’681 patent. Pet. 1. Claims 1, 11, 21, and 31 are the independent challenged claims. Claims 2–10 depend from claim 1, claims 12–20 depend from claim 11, claims 22–30 depend from claim 21, and claims 32–40 depend from claim 31. Independent claims 1 and 11, reproduced below, are illustrative of the claimed subject matter.

1. [1.pre¹] A method for synchronizing a plurality of nodes on a communication network, comprising:

[1.a] exchanging a local clock time between a first node and a second node over the communication network, wherein the exchange comprises:

[1.a.i] transmitting a first packet from the first node to the second node, wherein the first packet includes a first packet clock time set to the local clock time of the first node at transmission time, and includes a scheduled arrival clock time, and

[1.a.ii] setting the local clock time of the second node to the first packet clock time;

[1.b] performing a ranging method between the first and second nodes based on the local clock time exchanged, wherein the ranging method results in an estimated propagation delay between the first and second node, and wherein the ranging method comprises:

[1.b.i] transmitting a second packet from the second node to the first node, wherein the second packet is transmitted from the second node at the scheduled arrival clock time, and wherein the second packet is received by the first node at an actual arrival clock time,

¹ Herein, we use Petitioner’s designations for the limitations of claims 1 and 11. Pet. v–vi, viii–x.

- [1.b.ii] calculating and storing the estimated propagation delay at the first node, wherein calculating the estimated propagation delay is based on the scheduled arrival clock time and the actual arrival time, and
- [1.b.iii] transmitting a third packet from the first node to the second node, wherein the third packet comprises the estimated propagation delay; and
- [1.c] adjusting the local clock time of either the first or second node based on the estimated propagation delay, thereby resulting in a synchronized local clock time between the first and second node.

11. [11.pre] A network device, comprising:

- [11.a] a controller;
- [11.b] a device module;
- [11.c] memory coupled to the controller;
- [11.d] computer executable program code on a non-transitory computer readable medium configured to cause the controller to perform the functions of:
- [11.e] exchanging local clock times between a first node and a second node over a communication network, wherein the exchange comprises:
 - [11.e.i] transmitting a first packet from the first node to the second node, wherein the first packet includes a first packet clock time set to the local clock time of the first node at transmission time, and includes a scheduled arrival clock time, and
 - [11.e.ii] setting the local clock time of the second node to the first packet clock time;
- [11.f] performing a ranging method between the first and second nodes based on the local clock times exchanged between the first and second nodes, wherein the ranging method results in an estimated propagation delay between the first and second nodes, and wherein the ranging method comprises:

- [11.f.i] transmitting a second packet from the second node to the first node, wherein the second packet is transmitted from the second node at the scheduled arrival clock time, and wherein the second packet is received by the first node at an actual arrival clock time,
- [11.f.ii] calculating and storing the estimated propagation delay at the first node, wherein calculating the estimated propagation delay is based on the scheduled arrival clock time and the actual arrival time, and
- [11.f.iii] transmitting a third packet from the first node to the second node, wherein the third packet comprises the estimated propagation delay; and
- [11.g] adjusting the local clock times of either the first and second nodes based on the estimated propagation delay, thereby resulting in a synchronized local clock time at the first and second nodes.

Ex. 1001, 14:17–49, 15:12–52.

E. Evidence

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

Name	Reference	Exhibit
IEEE802.3ah	IEEE Std 802.3ah™-2004 (Sept. 7, 2004)	1005
Shvodian	US 2008/0101253 A1, published May 1, 2008	1006
Frei	US 2007/0140127 A1, published June 21, 2007	1007
Ovadia	Shlomo Ovadia, <i>MoCA: Ubiquitous Multimedia Networking in the Home</i> , Broadband Access Communication Technologies II, Proc. of SPIE Vol. 6776, 67760C (2007)	1008
Smith	US 7,821,958 B2, filed Dec. 21, 2007, issued Oct. 26, 2010	1009

Petitioner also relies on the Declaration of Scott Acton, Ph.D. (Ex. 1003) to support its contentions that the challenged claims are unpatentable.

F. Asserted Grounds

Petitioner asserts that the challenged claims of the '681 patent are unpatentable based on the grounds in the table below (Pet. 2–3):

Claims Challenged	35 U.S.C. §²	Reference/Basis
1–3, 6–10	103(a)	IEEE802.3ah
11–13, 16–23, 26–33, 36–40	103(a)	IEEE802.3ah, Shvodian
1–3, 6–10	103(a)	IEEE802.3ah, Frei
11–13, 16–23, 26–33, 36–40	103(a)	IEEE802.3ah, Shvodian, Frei
9, 10	103(a)	IEEE802.3ah, Frei, Ovadia
19, 20, 29, 30, 39, 40	103(a)	IEEE802.3ah, Shvodian, Frei, Ovadia
4, 5	103(a)	IEEE802.3ah, Frei, Smith
14, 15, 24, 25, 34, 35	103(a)	IEEE802.3ah, Shvodian, Frei, Smith

III. ANALYSIS

A. Legal Standard

A patent claim is unpatentable under 35 U.S.C. § 103 when the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art;

² The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 284 (2011), amended 35 U.S.C. § 103, effective March 16, 2013. Because the challenged claims of the '681 patent have an apparent effective filing date before March 16, 2013, the pre-AIA version of § 103 applies. *See* Ex. 1001, codes (22), (60).

(3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness, i.e., secondary considerations.³ *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner asserts that a person of ordinary skill in the art would have had

a Bachelor's degree in electrical engineering, computer engineering, computer science, or a related field, and 2-3 years of experience in design or development of communication systems/networks including cable communication systems, or the equivalent. Additional education could substitute for experience, or experience in the field could substitute for formal education.

Pet. 9 (citing Ex. 1003 ¶¶ 1–11, 16, 17). Patent Owner does not contest Petitioner's proposed definition of the level of ordinary skill in the art. *See generally* Prelim. Resp.

For purposes of this Decision, we adopt Petitioner's proposal as reasonable and consistent with the '681 patent specification and the prior art.

C. Claim Construction

We interpret the challenged claims

using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b), including construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.

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

37 C.F.R. § 42.100(b). Under that standard, we generally give claim terms their ordinary and customary meaning, as would be understood by a person of ordinary skill in the art at the time of the invention, in light of the language of the claims, the specification, and the prosecution history.

Phillips v. AWH Corp., 415 F.3d 1303, 1312–14 (Fed. Cir. 2005) (en banc).

“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’”

Realtime Data, LLC v. Iancu, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999)).

Petitioner states that “[b]ecause the Challenged Claims are obvious under any reasonable interpretation, no express constructions are required here.” Pet. 4 (citing *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011)). Patent Owner does not propose any express construction at this time. *See generally* Prelim. Resp. For purposes of this Decision, no claim terms require express construction.

D. Overview of the Asserted Art

1. IEEE802.3ah

IEEE802.3ah is titled, on the cover page:

IEEE Standards 802.3ah™

IEEE Standard for Information technology—
Telecommunications and information exchange between
systems—Local and metropolitan area networks—Specific
requirements

Part 3: Carrier Sense Multiple Access with Collision Detection
(CSMA/CD) Access Method and Physical Layer Specifications

Amendment: Media Access Control Parameters, Physical Layers, and Management Parameters for Subscriber Access Networks.

Ex. 1005, 1.⁴ IEEE802.3ah describes “[e]thernet for subscriber access networks, also referred to as ‘Ethernet in the First Mile’, or EFM, [which] combines a minimal set of extensions to the IEEE 802.3 Media Access Control (MAC) and MAC Control sublayers with a family of Physical Layers.” *Id.* at 196. IEEE802.3ah also describes “the concept of Ethernet Passive Optical Networks (EPONs), in which a point to multipoint (P2MP) network topology is implemented with passive optical splitters, along with extensions to the MAC Control sublayer and Reconciliation sublayer as well as optical fiber [Physical Medium Dependent sublayers or] PMDs to support this topology.” *Id.*

According to IEEE802.3ah, “[t]he P2MP medium is a passive optical network (PON), an optical network with no active elements in the signal’s paths from source to destination.” Ex. 1005, 438. Figure 64-1 of IEEE802.3ah, reproduced below, depicts a simplified P2MP topology example. *Id.*

⁴ Citations to the pages of IEEE802.3ah are made with reference to the page numbering added by Petitioner to Exhibit 1005.

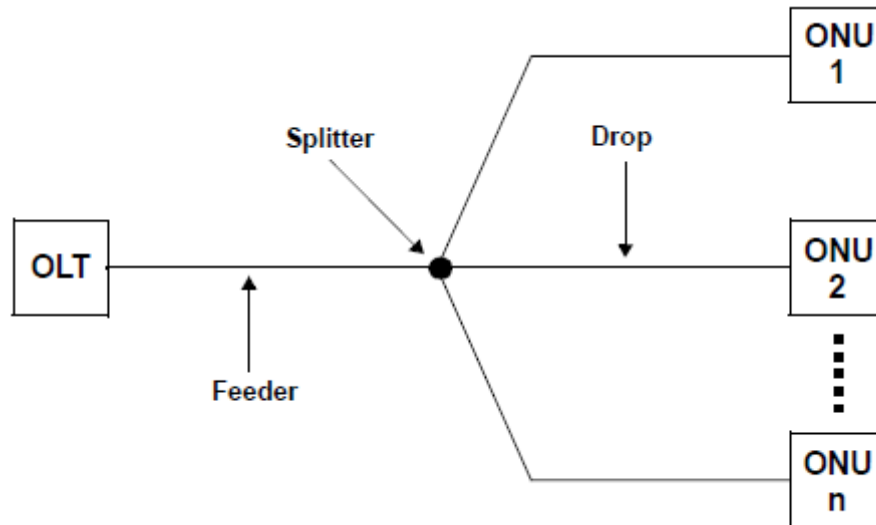


Figure 64-1—PON topology example

IEEE802.3ah explains that “P2MP is an asymmetrical medium based on a tree (or tree-and-branch) topology,” wherein “[t]he DTE connected to the trunk of the tree is called optical line terminal (OLT) and the DTEs connected at the branches of the tree are called optical network units (ONU).” *Id.* According to IEEE802.3ah, “[t]he OLT typically resides at the service provider’s facility, while the ONUs are located at the subscriber premises.” *Id.* IEEE802.3ah further describes that:

[i]n the downstream direction (from the OLT to an ONU), signals transmitted by the OLT pass through a 1:N passive splitter (or cascade of splitters) and reach each ONU. In the upstream direction (from the ONUs to the OLT), the signal transmitted by an ONU would only reach the OLT, but not other ONUs. To avoid data collisions and increase the efficiency of the subscriber access network, ONU’s transmissions are arbitrated. This arbitration is achieved by allocating a transmission window (grant) to each ONU. An ONU defers transmission until its grant arrives. When the grant arrives, the ONU transmits frames at wire speed during its assigned time slot.

Id.

IEEE802.3ah explains that “[b]oth the OLT and the ONU have 32-bit counters” that “provide a local time stamp.” Ex. 1005, 444. According to IEEE802.3ah, “[w]hen the ONU receives MPCPDUs, it sets its counter according to the value in the timestamp field in the received MPCPDU,” and “[w]hen the OLT receives MPCPDUs, it uses the received timestamp value to calculate or verify a round trip time between the OLT and the ONU,” where “[t]he RTT [round trip time] is equal to the difference between the timer value and the value in the timestamp field.” *Id.* According to IEEE802.3ah, “[t]he client can use this RTT for the ranging process.” *Id.* IEEE802.3ah defines “[r]anging” as “[a] procedure by which the propagation delay between a master (e.g., OLT) and slave (e.g., ONU) is measured.” *Id.* at 21. Figure 64-4 of IEEE802.3ah, reproduced below, illustrates the round trip time calculation. *Id.* at 445.

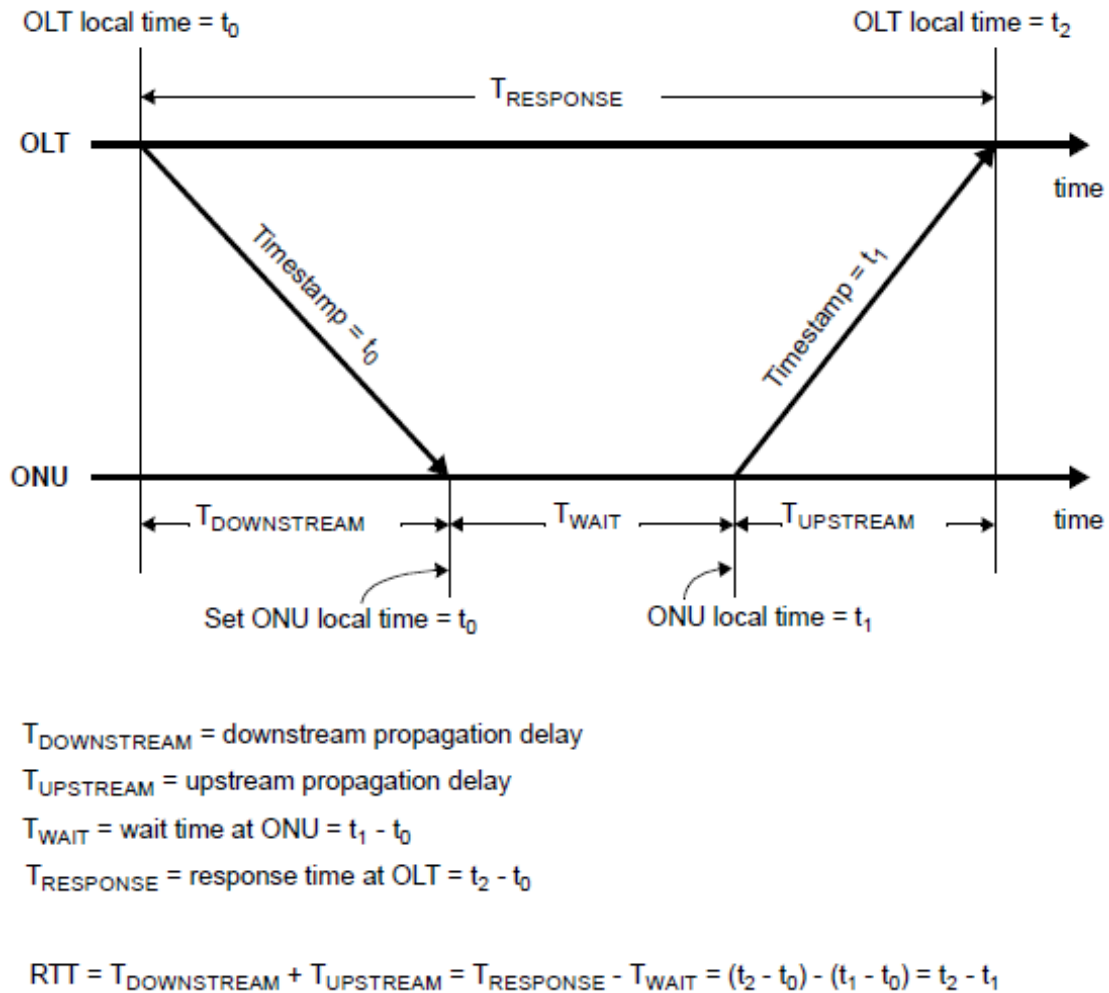


Figure 64-4—Round trip time calculation

As shown in Figure 64-4, the OLT transmits a first message with a timestamp equal to the “OLT local time” (t_0). *Id.* Then, the ONU sets its local time to t_0 , waits for a time equal to T_{WAIT} , and then sends a second message with a timestamp equal to the ONU’s local time (t_1). *Id.* When the second message arrives at the OLT, the local time is t_2 . *Id.* In Figure 64-4, the transmission time of the first message is described as the downstream propagation delay ($T_{\text{DOWNSTREAM}}$) and the transmission time of the second message is described as the upstream propagation delay (T_{UPSTREAM}). *Id.* According to IEEE802.3ah, “[t]he round trip delay computation is

performed by the OLT, using the timestamp in MPCP messages from the ONU.” *Id.* at 21. Textual description in Figure 64-4 indicates that the RTT is equal to $T_{\text{DOWNSTREAM}}$ plus T_{UPSTREAM} , which is t_2 minus t_1 . *Id.* at 445.

2. *Shvodian*

Shvodian is titled “Methods and Apparatus for Round Trip Time Measurements.” Ex. 1006, code (54). Shvodian “relates generally to transmissions between a source node and a destination node in a network,” where “[t]he source node may be a content provider such as a digital video disc (DVD) player, set top box, D-VHS player, satellite receiver, etc.” and “[t]he destination node may be a content sink such as a receiver, monitor, etc.” *Id.* ¶¶ 1–2. According to Shvodian, “the source node may be connected to a first bridge and the destination node may be connected to a second bridge via an existing cable infrastructure.” *Id.* ¶ 3. Shvodian explains that “[t]he media access control (MAC) layer of the first and second bridges can adopt time division multiple access (TDMA) for exchanging data in which a superframe is generated for transmitting and receiving data as in an IEEE 802.15.3 MAC layer.” *Id.*

According to Shvodian, “there will be latency from the time a packet arrives at a superframe to the time that it is transmitted over a particular slot to the destination node and from the time a response arrives at a superframe to the time it is transmitted over a particular slot to the source node” and this “inherent nature of the TDMA-based superframe may render it difficult to achieve the minimum round trip time required by the content at the source node, thereby preventing verification of localization between the source node and the destination node.” *Id.* ¶ 5.

Shvodian describes a method for measuring round trip time (RTT), using an RTT measurement packet. Ex. 1006, code (57).

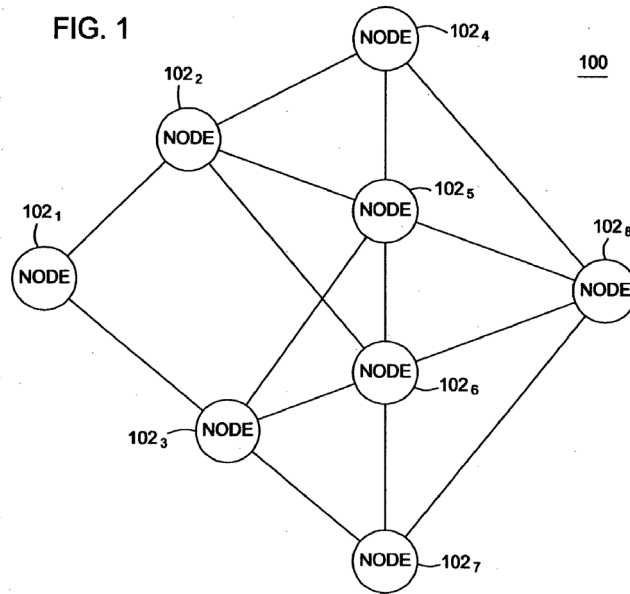
The RTT from transmission of the RTT measurement packet to reception of a response from the destination node is measured to determine if the RTT is greater than a predetermined time period. If the RTT is greater than the predetermined time period, an RTT measurement packet is repeatedly retransmitted at a different time interval and the RTT is remeasured until either the RTT measurement packet has been transmitted a predetermined number of times or the RTT is not greater than the predetermined time period.

Id.

3. *Frei*

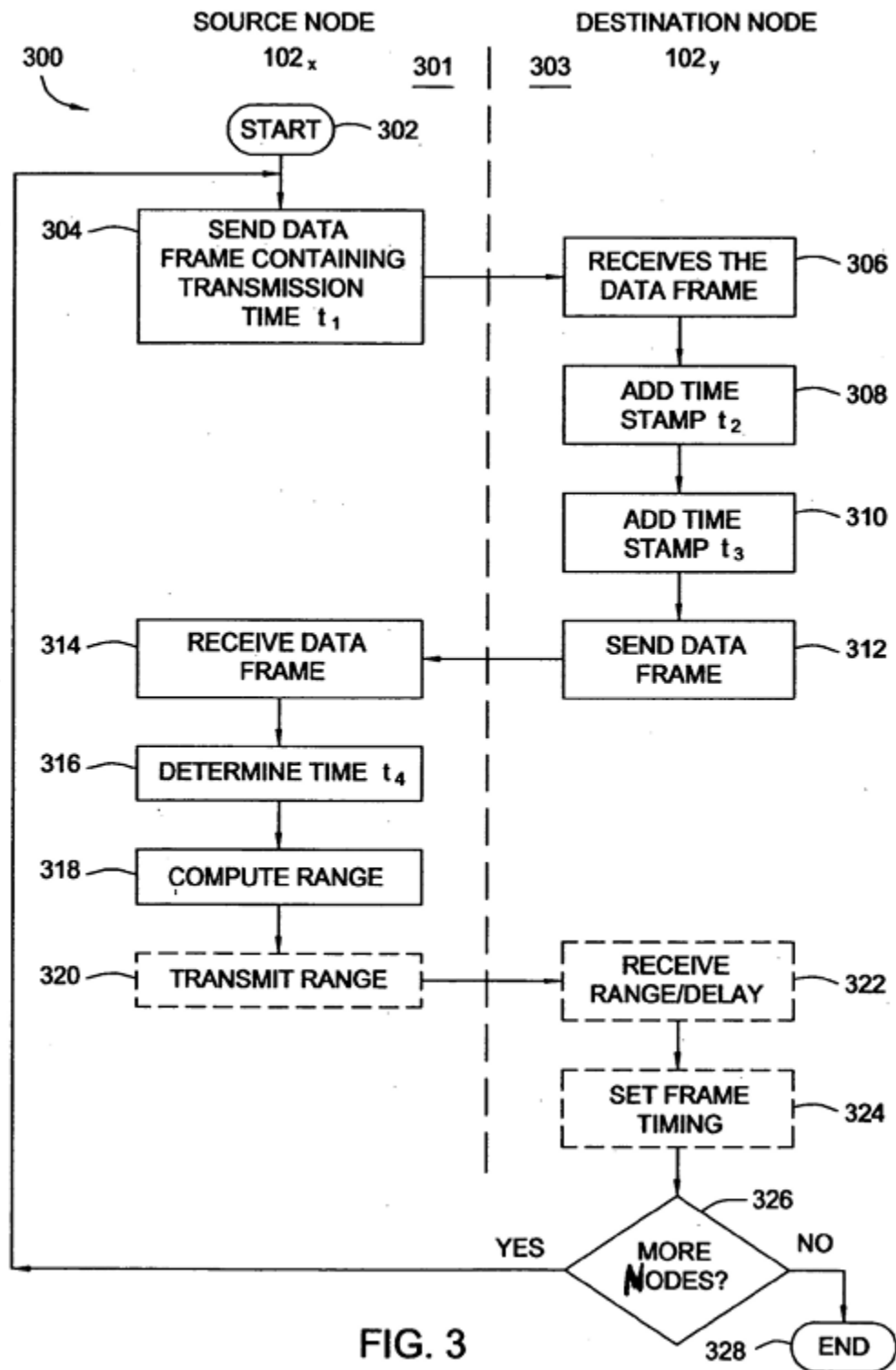
Frei is titled “Method and Apparatus for Efficient Transfer of Data Over a Network.” Ex. 1007, code (54). *Frei* is directed to “a method and apparatus for improving the efficiency of a network and/or providing network monitoring and management capability.” *Id.* ¶ 9. *Frei* explains that to avoid transmission inefficiency, “the propagation delay may be measured by using time synchronized nodes and sending time of transmission information between nodes.” *Id.* ¶ 7.

Figure 1 of *Frei*, reproduced below, depicts network 100 comprising connected nodes 102. Ex. 1007 ¶ 17.



As shown in Figure 1, network 100 comprises nodes 102_{1-8} interconnected to each other by multiple paths. *Id.* Frei describes that source node 102_1 determines the propagation delay for data to reach a destination node 102_2 , enabling it to “transmit data more efficiently by ensuring a greater portion of a specific time slot is used for transmitting data to the destination node 102_2 .” *Id.* ¶ 18. Frei explains that “propagation delay is the time lag between the departure of transmitted data from a source node 102_1 and the arrival of the transmitted data at a destination node 102_2 .” *Id.* ¶ 23.

Figure 3 of Frei, reproduced below, shows a flow chart of a method 300 comprising the method steps 301 performed by the source node 102_x and the method steps 303 performed by the destination node 102_y . Ex. 1007 ¶¶ 28–29.



At step 304, source node 102_x transmits data frame 402 including transmission time t_1 to destination node 102_y. *Id.* ¶ 29. After receiving frame

402 (step 306), destination node 102_y stamps the message with its own timestamp 409 indicating the local time t_2 when the destination node 102_y received the complete frame of data, stamps the message with the time of the return transmission from the destination node (t_3), and then transmits data frame 404 to source node 102_x (steps 308, 310, and 312, respectively). *Id.* ¶¶ 31, 33, 34. After receiving data frame 404 (step 314), source node 102_x determines the local time of complete reception of the data frame, t_4 (step 316). *Id.* ¶ 34. At step 318, source node 102_x computes the range between source node 102_x and destination node 102_y based on the timestamp information and the time t_4 . *Id.* Frei derives the propagation delay from $(t_4 - t_1 - (t_3 - t_2))/2$. *Id.*

Figure 3 also illustrates optional additional steps 320–324. *Id.* ¶ 37, Fig. 3. At step 320, source node 102_x transmits the range and/or the propagation delay to destination node 102_y. *Id.* After destination node 102_y receives the range (or delay) (step 322), the destination node sets the frame timing for reception of data from the source node 102_x such that data frames are efficiently utilized (step 324). *Id.*

4. Ovadia

Ovadia is titled “MoCA: Ubiquitous Multimedia Networking in the Home.” Ex. 1008, 1.⁵ According to Ovadia, “[t]he Multimedia-over-Coax Alliance (MoCA) standard is rapidly emerging as the de-facto standard in North America for multimedia home networking” based on “the desire to have digital content from various sources such as DVRs, audio devices and PCs reliably available anywhere in the home using the in-home existing

⁵ Citations to the pages of Ovadia are made with reference to the page numbering added by Petitioner to Exhibit 1008.

coaxial cable wiring.” *Id.* Ovadia explains that the MoCA technology “is based on the MoCA MAC/PHY Specification v1.0 standard.” *Id.* at 2 (citing www.mocalliance.org).

5. *Smith*

Smith is titled “Method for Estimating and Monitoring Timing Errors in Packet Data Networks.” Ex. 1009, code (54). Smith relates “to a system and method for estimating timing/phase wander and for regenerating T1/DS1 clocks using information derived from timing pseudowire or packet data flows.” *Id.* at 1:8–13.

E. *Asserted Obviousness of Claims 1–3 and 6–10*

Petitioner asserts that claims 1–3 and 6–10 are unpatentable as obvious over IEEE802.3ah (Ground 1A) and over the combination of IEEE802.3ah and Frei (Ground 2A). Pet. 2, 11–46, 59–73. Petitioner also argues that claims 9 and 10 are unpatentable as obvious over IEEE802.3ah, Frei, and Ovadia (Ground 3A). *Id.* at 74–79. Patent Owner disputes Petitioner’s showing for independent claim 1. Prelim. Resp. 22–33, 48–58.

1. *Independent Claim 1*

Our determinations herein turn on the parties’ dispute as to whether the asserted prior art combinations teach element 1.c, which recites “adjusting the local clock time of either the first or second node based on the estimated propagation delay, thereby resulting in a synchronized local clock time between the first and second node.” We discuss the parties’ dispute in connection with each of the two grounds in turn.

a) *Ground 1A: Obviousness Over IEEE802.3ah*

For the reasons given below, we find that Petitioner has not shown that element 1.c is taught by IEEE802.3ah. Petitioner makes three

arguments. Specifically, Petitioner argues that element 1.c is taught by (1) IEEE802.3ah's disclosure of performing "[c]ontinuous ranging for compensating round trip time variation" (Pet. 39 (quoting Ex. 1005, 439)); (2) a combination of IEEE802.3ah's disclosure of "compensating" for round trip time variation and IEEE802.3ah's disclosure that the "ONU's local clock time is set to t_0 " in connection with calculating RTT (*id.* at 39–40 (citing, e.g., Ex. 1005, Fig. 64-4; Ex. 1003 ¶¶ 114–120)); and (3) IEEE802.3ah's disclosure that "[r]eports shall be generated periodically, even when no request for bandwidth is being made" (*id.* at 41–42 (citing, e.g., Ex. 1005, 456, 469; Ex. 1003 ¶¶ 114–120)).

We start with Petitioner's first argument that element 1.c is taught by IEEE802.3ah's disclosure of performing "[c]ontinuous ranging for compensating round trip time variation." Pet. 39 (quoting Ex. 1005, 439). In connection with this argument, Petitioner points to IEEE802.3ah's disclosure that the RTT "is notified to the client" so the "client can use this RTT for the ranging process." *Id.* (quoting Ex. 1005, 444). Although the IEEE802.3ah's disclosures relied on by Petitioner describe "compensating," those disclosures do not describe adjusting a local clock time.

Petitioner argues that a person of ordinary skill in the art would have understood that "to compensate for propagation delay . . . at least one of the nodes' clocks would have to be adjusted." *Id.* (citing Ex. 1003 ¶¶ 114–120). Petitioner relies on Dr. Acton's testimony that in his opinion "local clocks *would have to be* adjusted" to compensate for propagation delay. Ex. 1003 ¶ 116 (emphasis added). Patent Owner argues that IEEE802.3ah does not teach or suggest "any adjusting of a clock based on a propagation delay" and "the Petition improperly relies on expert testimony to bridge the gap of the

lacking disclosure.” Prelim. Resp. 32 (citing Patent Trial and Appeal Board Consolidated Trial Practice Guide (2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated> (“Consolidated Practice Guide” or “CTPG”) 36).

Consistent with Patent Owner’s argument, we find that IEEE802.3ah does not describe adjusting a local clock time that results in “compensating” for round trip time. Ex. 1005, 439. We are not persuaded by the Petition or Dr. Acton’s testimony that a person of ordinary skill in the art would have understood from IEEE802.3ah’s disclosure of “ranging for compensating” for round trip time that “local clocks *would have to be* adjusted.” Pet. 39; Ex. 1003 ¶ 116 (emphasis added). Dr. Acton’s Declaration does not disclose underlying facts or data that support sufficiently that compensating *requires* adjusting a local clock. 37 C.F.R. § 42.65(a) (“Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.”).

We turn to Petitioner’s second argument that element 1.c is taught by a combination of IEEE802.3ah’s disclosure of “compensating” for round trip time variation and IEEE802.3ah’s disclosure that “ONU’s local clock time is set to t_0 ” in connection with calculating RTT. Pet. 39–40 (citing, e.g., Ex. 1005, Fig. 64-4; Ex. 1003 ¶¶ 114–120). Petitioner, more specifically, argues that the “ONU’s local clock time is set to t_0 ” in IEEE802.3ah’s Figure 64-4 and, therefore, “[i]t thus would have been obvious to a POSITA^[6] to adjust the local clock time of a node using propagation delay instead of RTT.” *Id.* at 40 (citing Ex. 1005, Fig. 64-4; Ex. 1003 ¶¶ 114–120). Figure 64-4 of IEEE802.3ah has text stating “OLT local time = t_0 ” on the far

⁶ POSITA refers to a person of ordinary skill in the art.

left-hand side and then “[s]et ONU local time = t_0 ” based on “Timestamp = t_0 ” received from the OLT after a time period equal to $T_{\text{DOWNSTREAM}}$.

Ex. 1005, Fig. 64-4, 445. Patent Owner argues that “ T_0 is the timestamp value the OLT sends at the *beginning* of the RTT calculation process” and, therefore, the adjustment is not “based on the estimated propagation delay” that results from “the ranging method, which has not been completed at this point in time.” Prelim. Resp. 31 (citing, e.g., Ex. 1005, Fig. 64-4, 444–445).

Claim element 1.c recites “adjusting the local clock time of either the first or second node *based on the estimated propagation delay, thereby resulting in a synchronized local clock time between the first and second node.*” In Figure 64-4, the OLT local time is no longer t_0 after the time period of $T_{\text{DOWNSTREAM}}$, which is when the “ONU local time” is set to be equal to t_0 . Ex. 1005, 445, Fig. 64-4. Although Figure 64-4 of IEEE802.3ah describes adjusting the local clock time of a node, Petitioner has not shown that the adjustment is “*based on the estimated propagation delay*” and results in “*a synchronized local clock time between the first and second node,*” as required in element 1.c.

Petitioner’s argument that in light of IEEE802.3ah’s Figure 64-4 disclosure “[i]t thus would have been obvious to a POSITA to adjust the local clock time of a node using propagation delay instead of RTT” (Pet. 40 (citing Ex. 1005, Fig. 64-4; Ex. 1003 ¶¶ 114–120)) assumes that IEEE802.3ah’s disclosure of “compensating” teaches adjusting a local clock time. Pet. 39 (citing Ex. 1005, 439); Ex. 1003 ¶¶ 115–116 (citing Ex. 1005, 439). That argument is not persuasive for the reasons discussed above.

We turn to Petitioner’s third argument that element 1.c is taught by IEEE802.3ah’s disclosure that “[r]eports shall be generated periodically,

even when no request for bandwidth is being made.” Pet. 41–42 (citing, e.g., Ex. 1005, 456, 469; Ex. 1003 ¶¶ 114–120). Petitioner argues that a “POSITA would have understood that this teaches a periodic synchronization using the range procedure discussed above and, as a result, that synchronization between the node clocks was required.” *Id.* at 42 (citing Ex. 1003 ¶¶ 114–120).

We are not persuaded by Petitioner’s third argument. Although IEEE802.3ah describes that “for proper operation” of the report mechanism “the OLT shall grant the ONU periodically,” as discussed with respect to Petitioner’s first and second arguments, the only clock adjustment identified in the Petition is setting the ONU local time to t_0 when the OLT local time no longer is t_0 . Ex. 1005, Fig. 64-4, 445, 469. Petitioner has not shown that this adjustment is “*based on the estimated propagation delay*” and results in “*a synchronized local clock time between the first and second node,*” as required in element 1.c.

For the reasons given, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that independent claim 1 is unpatentable as obvious over IEEE802.3ah.

b) Ground 2A: Obviousness Over IEEE802.3ah and Frei

Petitioner argues that “Frei discloses [1.c].” Pet. 72 (citing Ex. 1007 ¶¶ 24, 37; Ex. 1003 ¶¶ 303–308). Petitioner relies on Frei’s teaching that “the source node 102₁ . . . transmits the propagation delay to the destination node 102₂. *The destination node 102₂ uses the delay to delay the timeslot in which the destination node 102₂ will listen for a transmission from the source node 102₁.*” *Id.* (quoting Ex. 1007 ¶ 24). Petitioner argues that “IEEE802.3ah’s technique synchronizes nodes by changing the local clock

times” and, therefore, a person of ordinary skill in the art “would have understood that, in the context of IEEE802.3ah, the way to ‘delay the timeslot,’ as disclosed by Frei, would be to adjust the nodes local clock time by the estimated propagation delay.” *Id.* (citing Ex. 1003 ¶¶ 303–308).

Patent Owner argues “[w]hile *Frei* describes adjusting frame timing, it fails to teach or suggest ***adjusting a local clock time*** based on an estimated propagation delay.” Prelim. Resp. 49 (citing Ex. 1007 ¶ 37). Patent Owner argues “*Frei* expressly confirms that the clocks between the nodes are misaligned, in a step that occurs only at the source node,” which “confirms” that there is “no adjustment of a clock.” *Id.* at 50 (citing Ex. 1007 ¶ 25, Fig. 5).

Frei describes that the destination node uses the propagation delay “to delay the timeslot in which the destination node 102₂ will listen for a transmission from the source node 102₁.” Ex. 1007 ¶ 24 (emphasis added). The other disclosure in *Frei* relied on in the Petition describes that the destination node “sets the frame timing for reception of data.” *Id.* ¶ 37. *Frei* describes that “the clocks of the source node and the destination node are misaligned by an amount equal to the propagation delay between the two nodes, allowing frames transmitted from the source node to the destination node to be received at a proper time.” *Id.* ¶ 40. Thus, we find that *Frei* discloses an alternative to adjusting local clock time to provide proper timing for data transmission. Specifically, as taught by *Frei*, setting frame timing may be achieved by misaligning clocks of two nodes and does not require adjusting a local clock time that results in a synchronized local clock time between the first and second node. *Id.*

Regarding Petitioner’s argument that a person of ordinary skill in the art would have understood that “the way to ‘delay the timeslot’” would have been “to adjust the nodes local clock time” (Pet. 72 (citing Ex. 1003 ¶¶ 303–308)), the Petition does not address that Frei does not adjust local clock time based on an estimated propagation delay instead specifically misaligning the clocks to synchronize the local clock time between the first and second nodes. Ex. 1007 ¶ 40. The Petition does not include sufficient argument that element 1.c would have been obvious over the teachings of Frei.

Petitioner’s reliance on IEEE and its argument that “IEEE802.3ah’s technique synchronizes nodes by changing the local clock times” (Pet. 72 (citing Ex. 1003 ¶¶ 303–308)) does not remedy the deficiency in Frei. As discussed with respect to Ground 1A, the only clock adjustment identified in the Petition is setting the ONU local time to t_0 when the OLT local time no longer is t_0 . Ex. 1005, Fig. 64-4, 445. Petitioner has not shown that this adjustment is “*based on the estimated propagation delay*” and results in “*a synchronized local clock time between the first and second node,*” as required in element 1.c.

For the reasons given, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that independent claim 1 is unpatentable as obvious over the combination of IEEE802.3ah and Frei.

2. Claims 2, 3, and 6–10

Claims 2, 3, and 6–10 depend directly from independent claim 1. Petitioner’s arguments and evidence for dependent claims 2, 3, and 6–10 do not remedy the deficiencies discussed with respect to the independent claims. *See* Pet. 42–46, 72, 73.

Accordingly, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 2, 3, and 6–10 are unpatentable.

F. Asserted Obviousness of Claims 11–13, 16–23, 26–33, and 36–40

Petitioner asserts that claims 11–13, 16–23, 26–33, and 36–40 are unpatentable as obvious over (1) the combination of IEEE802.3ah and Shvodian (Ground 1B); and (2) the combination of IEEE802.3ah, Shvodian, and Frei (Ground 2B). Pet. 47–58, 73–74. Petitioner also asserts that claims 19, 20, 29, 30, 39, and 40 are unpatentable as obvious over IEEE802.3ah, Shvodian, Frei, and Ovadia (Ground 3B). *Id.* at 79, 80. Patent Owner disputes Petitioner’s showing for claims 11, 21, and 31. Prelim. Resp. 33–48, 58.

1. Independent Claims 11, 21, and 31

Independent claims 11, 21, and 31 recite elements 11.g, 21.c, and 31.f that are similar to element 1.c discussed above with respect to claim 1 in that each of elements 11.g, 21.c, and 31.f require adjusting “the local clock times of either the first and second nodes based on the estimated propagation delay, thereby resulting in a synchronized local clock time at the first and second nodes.” For elements 11.g, 21.c, and 31.f, Petitioner relies on its earlier analysis regarding element 1.c without supplementation. Pet. 51, 52, 56, 57. Accordingly, Petitioner has not shown a reasonable likelihood of prevailing on its assertion that independent claims 11, 21, and 31 are unpatentable.

2. *Claims 12, 13, 16–20, 22, 23, 26–30, 32, 33, and 36–40*

Claims 12, 13, and 16–20 depend from claim 11, claims 22, 23, and 26–30 depend from claim 21, and claims 32, 33, and 36–40 depend from claim 31. Petitioner’s arguments and evidence for dependent claims 12, 13, 16–20, 22, 23, 26–30, 32, 33, and 36–40 do not remedy the deficiencies discussed with respect to the independent claims. *See* Pet. 58, 73, 74, 79, 80.

Accordingly, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 12, 13, 16–20, 22, 23, 26–30, 32, 33, and 36–40 are unpatentable.

G. *Asserted Obviousness of Claims 4, 5, 14, 15, 24, 25, 34, and 35*

Petitioner asserts that claims 4 and 5 are unpatentable as obvious over IEEE802.3ah, Frei, and Smith (Ground 4A). Pet. 3, 80–86. Petitioner asserts that claims 14, 15, 24, 25, 34, and 35 are unpatentable as obvious over IEEE802.3ah, Shvodian, Frei, and Smith (Ground 4B). *Id.* at 3, 86. Claims 4 and 5 depend from claim 1, claims 14 and 15 depend from claim 11, claims 24 and 25 depend from claim 21, and claims 34 and 35 depend from claim 31. Petitioner’s arguments and evidence for dependent claims 4, 5, 14, 15, 24, 25, 34, and 35 do not remedy the deficiencies discussed with respect to the independent claims. *See* Pet. 3, 80–86.

Accordingly, we conclude that Petitioner has not demonstrated a reasonable likelihood that it would prevail in showing that claims 4, 5, 14, 15, 24, 25, 34, and 35 are unpatentable.

IV. CONCLUSION

Based on the arguments and evidence presented by the parties, we conclude that Petitioner has not demonstrated a reasonable likelihood of prevailing with respect to at least one claim of the ’681 patent challenged in

the Petition. Therefore, we do not institute an *inter partes* review.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied*, and no *inter partes* review is instituted.

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