

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

UNIFIED PATENTS, LLC,
Petitioner,

v.

SOVEREIGN PEAK VENTURES, LLC,
Patent Owner.

IPR2021-00852
Patent 6,877,038 B2

Before KEVIN F. TURNER, GARTH D. BAER, and JOHN R. KENNY,
Administrative Patent Judges.

KENNY, *Administrative Patent Judge.*

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
Dismissing Petitioner's Motion to Exclude
35 U.S.C. § 318(a)

I. INTRODUCTION

Unified Patents LLC (“Petitioner”) filed a Petition to institute an *inter partes* review of claims 1–5 (the “challenged claims”) of U.S. Patent No. 6,877,038 B2 (Ex. 1001, the “’038 patent,” “challenged patent”) pursuant to 35 U.S.C. § 311 *et seq.* Paper 1 (“Pet.”). Sovereign Peak Ventures LLC (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

On November 9, 2021, we instituted an *inter partes* review of all challenged claims. Paper 8. Patent Owner filed a Patent Owner Response (Paper 12, “PO Resp.”). Petitioner filed a Reply (Paper 15, “Pet. Reply”), and Patent Owner filed a Sur-reply (Paper 17, “PO Sur-reply”). A transcript of an oral hearing held on August 10, 2022 (Paper 26, “Tr.”) has been entered into the record.

Petitioner also filed a Motion to Exclude (Paper 20, “Mot. Excl.”), in which Petitioner seeks to exclude the Declaration of Dr. Daniel Kaputa (Ex. 2005). Mot. Excl. 1. Patent Owner filed an Opposition to Petitioner’s Motion to Exclude (Paper 22), and Petitioner filed a Reply to Patent Owner’s Opposition to the Motion to Exclude (Paper 23).

We have jurisdiction under 35 U.S.C. § 6. For the reasons discussed below, we determine that Petitioner has shown, by a preponderance of the evidence, that claims 1–5 are unpatentable. Further, we dismiss Petitioner’s Motion to Exclude as moot.

A. Related Matters

The parties identify the following related district court litigations:

(i) *Sovereign Peak Ventures, LLC v. LG Electronics, Inc.*, No. 2:20-cv-00109 (E.D. Tex.)¹; and

¹ This case has terminated. Pet. 1.

(ii) *Sovereign Peak Ventures, LLC v. TCL Technology Group Corp.*, No. 2:21-cv-00008 (E.D. Tex.).

Pet. 1; Paper 3, 2.

B. Challenged Patent

The '038 patent relates to “a data transmission method and apparatus and more particularly to video streaming applications.” Ex. 1001, 1:7–9.

“An object of the invention to provide a method and an apparatus for receiving and transmitting video data forming a data stream leading to increased video quality when being operated on an unreliable channel.” *Id.* at 3:18–21. “According to the invention, retransmission of lost data frames is performed based on a comparison of the priority level of the frame with a threshold value.” *Id.* at 3:24–26.

Figure 4 of the '038 patent is reproduced below:

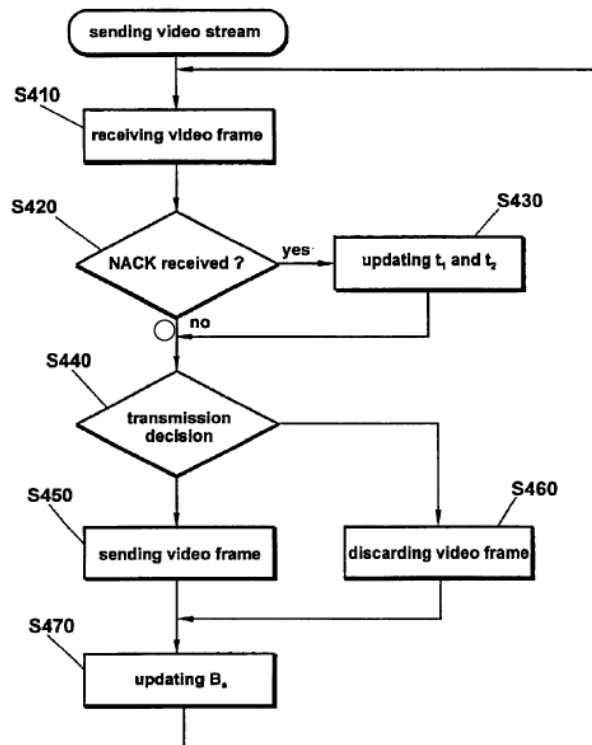


Fig. 4

Figure 4 above is a flow chart illustrating the process of sending a video stream. Ex. 1001, 4:42–43. In Figure 4,

the process of sending a video stream includes the step of receiving a video frame from the video source application 120 (step 410). Then it is checked in step S420 whether a retransmission request has been received. If no retransmission request has been received, the process proceeds with step 440, otherwise the information from the retransmission request is used to update the channel estimation first (step S430).

Id. at 5:40–49. Figure 5 of the '038 patent illustrates the transmission decision of step S440. *Id.* at 1:28–29. Figure 5 is reproduced below:

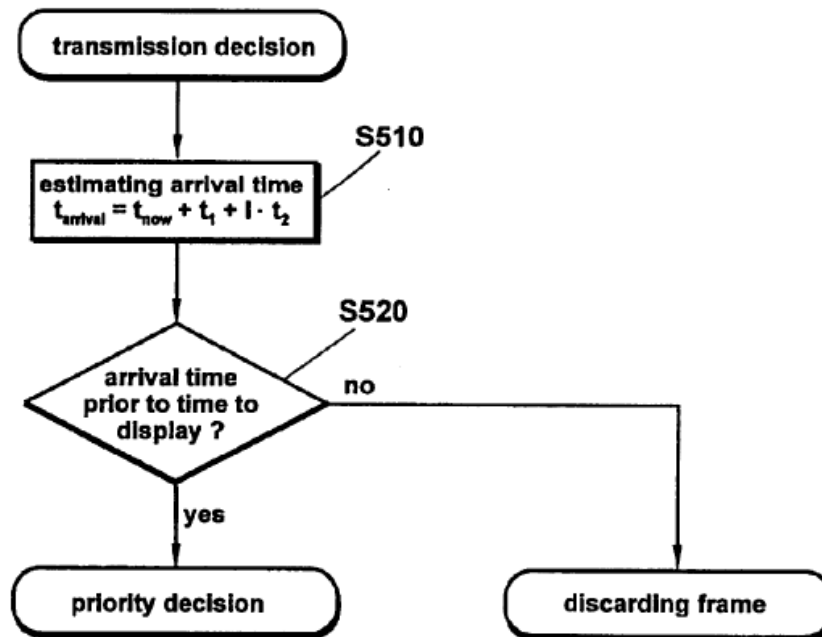


Fig. 5

Figure 5 above is “a flow chart illustrating the retransmission decision in the process of sending a video stream as depicted in [Figure] 4.” *Id.* at 4:44–45. The '038 patent explains that:

Before comparing the priority with a threshold value, a mechanism is introduced to decide whether the frame should be sent or discarded according to an estimated arrival time since it is not necessary to send frames that are already too late. For that purpose, the arrival time of the frame is estimated, i.e. the transmission delay is calculated in step S510.

If it is then determined in step S520 that the estimated arrival time is later than the desired time to display the video frame, the frame will be discarded instead of being transmitted. Otherwise, control unit 210 evaluates the priority of the missing frame

Id. at 6:30–41.

C. Challenged Claims

Petitioner challenges claims 1–5. Pet. 4–5. Claim 1 reads:

1. [1.0²] A method for receiving data packets from a transmitter, said method comprising:

[1.1] deciding that a data packet is missing;

[1.2.1] making a retransmission decision, based on [1.2.2] channel conditions, [1.2.3] importance of the missing data packet and [1.2.4] bit rates of previously received data packets, as to whether a retransmission request for the missing data packet is to be sent;

[1.3] sending the retransmission request to the transmitter if the retransmission decision is affirmative; and

[1.4] receiving a packet retransmitted by the transmitter in response to the retransmission request.

² For convenience, we use the designations in the Petition, shown in brackets, for the preambles and limitations of the challenged claims.

D. Asserted Challenges to Patentability and Prior Art

Petitioner challenges claims 1–5 based on the grounds in the table below.

Ground	Claim(s) Challenged	35 U.S.C. §	Reference(s)
1	1–4	103	Ravi ³ , Goetz ⁴
2	5	103	Ravi, Goetz, Rhee ⁵
3	1–4	103	Zhu ⁶
4	5	103	Zhu, Radha ⁷

Pet. 4–5.

Petitioner submitted a declaration from Dr. Henry Houh (Ex. 1003) with the Petition. Patent Owner submitted a declaration from Dr. Daniel Kaputa (Ex. 2005) with the Preliminary Response, and Petitioner submitted a second declaration from Dr. Houh (Ex. 1022) with Petitioner’s Reply.

II. LEVEL OF SKILL AND CLAIM CONSTRUCTION

A. Level of Skill in the Art

Petitioner argues that an ordinarily skilled artisan “at and before the priority date for the ’038 Patent . . . would have had a bachelor’s degree in computer science, computer engineering, electrical engineering, or a related subject, and one to two years of work experience with network-based technologies.” Pet. 8 (citing Ex. 1003 ¶¶ 43–46). Petitioner further argues that “[l]ess experience may be necessary with additional education (e.g., a

³ US 6,292,834 B1 (Ex. 1005).

⁴ US 5,956,729 (Ex. 1006).

⁵ US 6,104,757 (Ex. 1007).

⁶ US 5,768,527 (Ex. 1008).

⁷ US 6,629,318 B1 (Ex. 1013).

Master’s degree); likewise, less education may be necessary with additional work experience (e.g., 4–5 years).” *Id.*

In the Patent Owner Response, Patent Owner indicates that it adopts Petitioner’s definition for an ordinarily skilled artisan, but appears to slightly change that definition. Patent Owner states:

Patent Owner adopts Petitioner’s position that [an ordinarily skilled artisan], at the time of the invention, would have had a (1) an undergraduate degree in electrical engineering or a closely related scientific field, such as physics, computer engineering, or computer science, or similar advanced post-graduate education in this area; and (2) two or more years of experience with video processing.

PO Resp. 6 (citing Pet. 8, Ex. 2005 ¶¶ 26–27).

After reviewing the record, we find Petitioner’s proposed definition to be reasonable and adopt it. We, however, would reach the same conclusions if we were to adopt Patent Owner’s slightly different definition.

B. Claim Construction

In an *inter partes* review proceeding based on a petition filed on or after November 13, 2018, a patent claim shall be construed 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). 37 C.F.R. § 42.100(b) (2019). This rule adopts the same claim construction standard used by Article III federal courts, which follow *Phillips v. AWH Corp.*, 415 F.3d 1303 (Fed. Cir. 2005) (en banc), and its progeny. Under this standard, the words of a claim are generally given their “ordinary and customary meaning,” which is the meaning a term would have to a person of ordinary skill at the time of the invention, in the context of the entire patent including the specification. *See id.* at 1312–13.

1. Limitation 1.2.4

Limitation 1.2.4 recites “making a retransmission decision, based on . . . bit rates of previously received data packets.” Ex. 1001, 8:17–21. The parties dispute whether this recitation requires that the recited retransmission decision be directly based on bit rates of previously received data packets without the bit rates being subject to any additional or intermediate calculations. PO Resp. 13; Pet. Reply 1–2. In its Reply, Petitioner requests that we resolve this claim construction dispute. Pet. Reply 1–2. In its Sur-reply, Patent Owner does not address this claim construction dispute.⁸ *See generally* PO Sur-reply.

a. Arguments

In the Petition, Petitioner does not address the claim construction of limitation 1.2.4. Pet. 12. In the Patent Owner Response, Patent Owner does not request that limitation 1.2.4 be construed. PO Resp. 6–7. Patent Owner nevertheless argues that limitation 1.2.4 requires that the recited retransmission decision be directly based on bit rates of previously received data packets without the bit rates being subject to any additional or intermediate calculations. *Id.* at 13. Specifically, Patent Owner asserts that: “claim 1 recites *specific criteria* for the retransmission decision; one of which is bit rates of previously received data packets.” *Id.* (citing Ex. 1001, 8:13–25). Patent Owner continues: “[t]hat is, the retransmission decision is made based on these bit rates, *not on some other criteria that might be computed using bit rates.*” *Id.* Patent Owner cites only the express language of limitation 1.2.4 to support this argument. *Id.*

⁸ In the Petition and the Patent Owner Response, neither party requests that we expressly construe any claim term. Pet. 12; PO Resp. 6–7.

In its Reply, Petitioner disagrees with Patent Owner's argument regarding limitation 1.2.4. Pet. Reply 1. Petitioner asserts that the breadth of the limitation "is plain on its face: the retransmission decision . . . as to whether a retransmission request for the missing data packet is to be sent must be based on channel conditions, importance of the missing data packet and bit rates of previously received data packets." Pet Reply 1. Further, Petitioner argues that the limitation and claim 1 as a whole impose no further requirements and do not specify how the retransmission decision is based on the recited considerations. *Id.* According to Petitioner, "[t]hus, the retransmission decision may incorporate additional criteria or may be based on criteria that incorporates these factors." *Id.*

Petitioner further argues that construing limitation 1.2.4 to include the requirement proposed by Patent Owner would be inconsistent with the '038 patent's Specification. Pet. Reply 2. Petitioner asserts that the Specification "does not disclose any determinations based on . . . bit rates of previously received packets." *Id.* Petitioner further argues that the only discussion of a retransmission decision based on any bit rate is of sent frames, not received frames or packets. *Id.* Further, Petitioner asserts that the sole example in the Specification that uses bit rates to make a retransmission decision makes the decision based on criteria computed using bit rates, rather than on directly on the bit rates themselves. *Id.* at 2–3 (citing Ex. 1001, 4:17–18, 7:19–48, Fig. 8, Ex. 1022 ¶¶ 8–18).

Patent Owner does not address the construction of limitation 1.2.4 in its Sur-reply. *See generally* PO Sur-reply.⁹

b. Partial Construction

We agree with Petitioner that limitation 1.2.4 does not require that its recited retransmission decision be based directly on the bit rates of received packets without any additional or intermediate calculations. The plain language of the limitation merely requires that its retransmission decision be based on the bit rates of received packages. Ex. 1001, 8:16–21. This plain language does not require that the retransmission be directly based on the bit rates of received packages or that the bit rates not be subject to any additional and intermediate calculations. *Id.*

Further, we agree with Petitioner that the Specification does not support requiring that the recited retransmission be directly based on the bit rates of received packages or preclude any additional and intermediate calculations. We credit Dr. Houh’s undisputed testimony that the Specification does not disclose any determinations based on the bit rates of previously received packets. Ex. 1022 ¶ 12. We further credit Dr. Houh’s undisputed testimony that the only bit rate-based determination described in the Specification depends on the bit rates of sent frames, not received data

⁹ In the Patent Owner Response, Patent Owner cited definitions for “bit rate” and “data rate,” to support its argument that round trip time and received bit rate are different terms. PO Resp. 18 (citing Ex. 1017, 52, 126). That argument and the cited definitions concern whether round trip times and bit rates and data rates are the same, not whether limitation 1.2 requires that a retransmission decision be based directly on bit rates. We address the argument that round trip time and received bit rates are different and the definitions cited to support that argument in Section III.B.3.f.ii below.

packets. *Id.* (citing Ex. 1001, code (57), 7:19–40). Further, we credit Dr. Houh’s undisputed testimony that the ’038 patent does not use the raw value of bit rates to directly make a retransmission decision. *Id.* ¶ 13. We further credit Dr. Houh’s undisputed testimony that the Specification calculates a priority threshold level using an estimated bit rate of sent frames. *Id.* The priority threshold level is calculated by dividing the estimated bit rate of sent frames by the available channel bandwidth and multiplying by a factor to adapt the mechanism to the system and the assumed bit error rate. *Id.* ¶¶ 15–16; *see also* Ex. 1001, 7:6–18, 7:40–49, Fig. 8. In step 830 of Figure 8, the priority level of the frame is compared to the priority threshold level to determine whether to retransmit the frame. Ex. 1022 ¶ 16; *see also* Ex. 1001, 7:40–49, Fig. 8 (S830). Thus, we credit Dr. Houh’s undisputed testimony that in the Specification bit rates by themselves or on their own do not control a retransmission decision. Ex. 1022 ¶ 17. As Dr. Houh testifies, the retransmission decision in the ’038 patent instead is calculated from or influenced by the bit rates of previous packets. *Id.* Thus, it would be inconsistent with the disclosure of the Specification to construe limitation 1.2.4 as requiring that its recited retransmission be directly based on the bit rates of received packages or precluding any additional and intermediate calculations. *Id.* ¶ 10.

As mentioned, Patent Owner cites nothing other than the plain language of limitation 1.2.4 to support its position that the recited transmission must be based directly on the bit rates of received packets and not on any values that are calculated from bit rates. PO Resp. 18. As set forth above, we do not find that the plain language of limitation 1.2.4 supports this argument. Ex. 1001, 8:17–21.

Due to the plain language of limitation 1.2.4 and the retransmission disclosure in the Specification, we determine that limitation 1.2.4 does not require that the recited retransmission decision be based directly on the bit rates of received packets without any additional or intermediate calculations. Neither party has requested that we provide any further construction for this limitation, and we determine that no further construction is necessary. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017); *Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”).

2. No Other Limitation Requires Construction

No party has requested the we construe any other claim limitation, and we determine no express construction of any other limitation is necessary. *Nidec Motor*, 868 F.3d at 1017; *Vivid Techs.*, 200 F.3d at 803.

III. ANALYSIS OF ASSERTED GROUNDS

Petitioner must establish unpatentability by a preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d). “In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review).

A. Secondary Considerations

Neither party has argued that any secondary considerations or objective evidence of nonobviousness exist. Thus, we do not address secondary considerations or objective evidence of nonobviousness in this Decision.

B. Asserted Obviousness over Ravi and Goetz

Petitioner asserts that claims 1–4 would have been obvious over Ravi and Goetz. Pet. 5.

1. Ravi

Ravi describes an “efficient transmission protocol for transmitting multimedia streams from a server to a client computer.” Ex. 1005, code (57). In Ravi, a “transmission rate” may be “dynamically matched to the available bandwidth capacity of the network connection between the server and the client computer.” *Id.*

Figure 12 of Ravi is reproduced below:

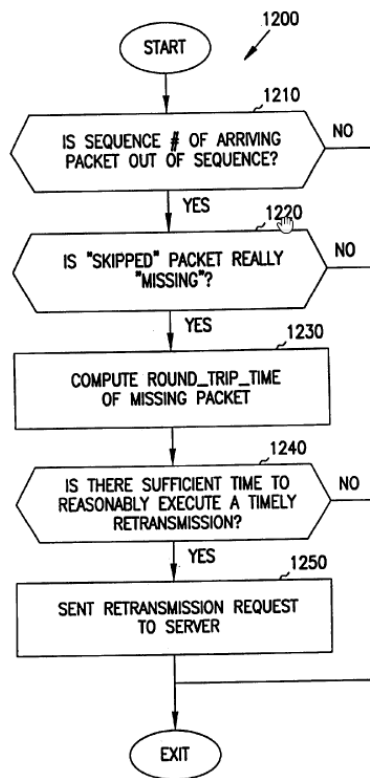


FIG. 12

Figure 12 above is a flowchart illustrating selective retransmission.

Ex. 1005, 4:13–14. Ravi explains:

as shown in FIG. 12, client computer 240 selectively requests retransmission of “missing” data packets for just-in-time (JIT) reliability. As data packets arrive at client computer 240, their sequence numbers are checked (step 1210). If a data packet arrives out of sequence, e.g., data packet# $n+2$ arrives after data packet # n , client computer 240 checks playout buffer 366 to see if the “skipped” packet, e.g., packet # $n+1$, is indeed “missing”, or if the skipped packet has arrived previously and is already stored in playout buffer 366 (step 1220).

If the skipped data packet# $n+1$ is not found in playout buffer 366, i.e., packet# $n+1$ is missing, client computer 240 computes a Round_Trip_Time for the missing data packet # $n+1$. The Round_Trip_Time is an estimate of the time beginning from the time a retransmission request is sent to stream server 220 till the time a copy of the missing data packet is received at client

computer 240 in response to the retransmission request (step 1230).

If there is sufficient time to reasonably execute a timely retransmission, e.g., the difference between the timestamp of the missing data packet and the timestamp of the currently displayed data packet is greater than the Round_Trip_Time (step 1240), then client computer 240 sends a request to server 220 for a retransmission of the missing data packet (1250).

Id. at 11:42–67.

2. Goetz

Goetz relates to “real-time multimedia applications and, more particularly, to the streaming of real-time multimedia information over a communication network.” Ex. 1006, 1:27–31. Figure 13 of Goetz is reproduced below:

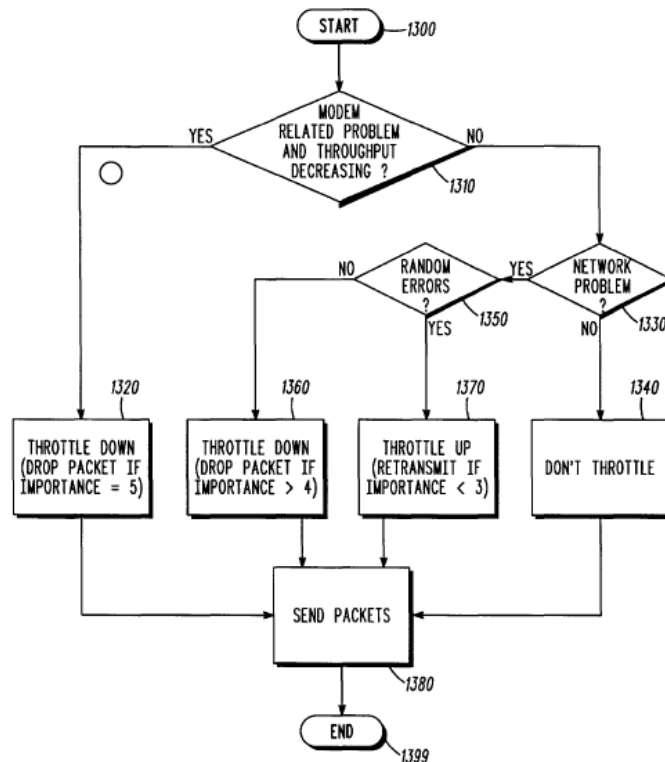


FIG.13

Figure 13 above is a flow diagram showing the retransmit logic of a server. Ex. 1006, 4:50–51. The logic of Figure 13 utilizes statistics gathered on the network. *Id.* at 13:56–57. In Goetz, “[t]he currently envisioned set of statistics necessary to create the inferences used by the logic of FIG. 13 include the following:

1. bit rate throughput;
2. network jitter;
3. round-trip delay; and
4. percentage and distribution of packet loss.”

Id. at 14:4–10.

3. Claim 1

We address the preamble and all limitations of claim 1 below. The only disputed limitation of claim 1, however, is limitation 1.2.4.

a. [1.0] A method for receiving data packets from a transmitter

Petitioner argues that Ravi teaches the preamble of claim 1. Pet. 14. Petitioner quotes Ravi’s disclosure that the “present invention is directed at the efficient and reliable streaming of data packets from stream server 220 to client computer 240.” *Id.* (quoting Ex. 1005, 6:31–36) (emphasis omitted). Petitioner maps the recited transmitter to stream server 220. *Id.* Patent Owner provides no counterarguments regarding the preamble of claim 1. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches the preamble of claim 1.¹⁰

¹⁰ For this reason, for this ground, we do not need to determine whether the preamble of claim 1 is limiting.

b. [1.1] deciding that a data packet is missing

Petitioner argues that Ravi teaches limitation 1.1. Pet. 15. Petitioner quotes Ravi's discussion of the flow chart of its Figure 12, which reads:

If a data packet arrives out of sequence, e.g., data packet# n+2 arrives after data packet # n, *client computer 240 checks playout buffer 366 to see if the "skipped" packet, e.g., packet # n+1, is indeed "missing", or if the skipped packet has arrived previously and is already stored in playout buffer 366 (step 1220).*

If the skipped data packet# n+1 is not found in playout buffer 366, i.e., packet# n+ 1 is missing, client computer 240 computes a Round_Trip_Time for the missing data packet # n+1.

Id. (quoting Ex. 1005, 11:42–60) (emphasis by Petitioner). Patent Owner provides no counterarguments regarding this limitation. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches limitation 1.1.

c. [1.2.1] making a retransmission decision . . . as to whether a retransmission request for the missing data packet is to be sent

Petitioner argues that Ravi teaches limitation 1.2.1. Pet. 16–17. Petitioner quotes Ravi's disclosure that "[i]f there is sufficient time to reasonably execute a timely retransmission . . . then client computer 240 *sends a request to server 220 for a retransmission of the missing data packet.*" *Id.* (quoting Ex. 1005, 11:61–67) (emphasis by Petitioner). Patent Owner provides no counterarguments regarding this limitation. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches limitation 1.2.1.

d. [1.2.2] making a retransmission decision based on channel conditions

Petitioner argues that the combination of Ravi and Goetz teaches limitation 1.2.2. Pet. 26–30. Petitioner asserts that claims 2–4 recite that channel conditions include available channel bandwidth, channel transmission delay, and channel bit error rate. *Id.* at 26–27. Petitioner argues that Goetz makes a retransmission decision based on available channel bandwidth. *Id.* at 27–28. Petitioner quotes the following description from Goetz regarding the flow diagram of Goetz’s Figure 13 (Figure 13 is reproduced above):

If there is a network problem in step 1330, the logic proceeds to step 1350 to determine whether or not the network problem involved random packet loss If step 1350 indicates that the problem is random packet loss, the logic proceeds to step 1370, where a ‘throttle up’ operation is performed if the statistics indicate that the *network has available bandwidth*. The available bandwidth is determined as part of the initial characterization of the network, discussed above with regard to FIG. 11B and *which may be continually updated as part of the concurrent network characterization*. More particularly, flags will be set to indicate that *packets having importance less than 3 should be sent multiple times*, e.g., in duplicate.

Id. at 27–28 (quoting Ex. 1006, 14:45–54) (emphasis by Petitioner).

Petitioner argues that an ordinarily skilled artisan would have been motivated to combine the teachings of Goetz and Ravi because “Ravi’s overarching consideration in making a retransmission decision is whether there is sufficient time to reasonably execute a timely retransmission.” *Id.* at 28. Petitioner also asserts that “Ravi also contemplates that ‘modifications to the above described algorithm’ are possible.” *Id.* (quoting Ex. 1005, 12:36–37).

Petitioner argues that an ordinarily skilled artisan would have been motivated to incorporate multiple data points with Ravi to make an informed decision as to whether there is sufficient time to execute a timely retransmission, and an ordinarily skilled artisan reading Ravi would have looked to references in the same field for teachings of additional data points. Pet. 28. According to Petitioner, “[s]uch teachings are provided by Goetz, which describes bit rate throughput and available bandwidth as considerations in determining whether to make a retransmission decision.” *Id.* at 28–29.

Petitioner further argues that “[a]lthough Goetz determines available bandwidth on the transmission end, rather than the receiving end, [an ordinarily skilled artisan] would have recognized that its teachings were applicable to Ravi’s determination on the client side.” Pet. 29. Patent Owner provides no counterarguments regarding limitation 1.2.2. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that the combination of Ravi and Goetz teaches limitation 1.2.2.

e. [1.2.3] making a retransmission decision based on importance of the missing data packet

Petitioner argues that Ravi teaches limitation 1.2.3. Pet. 17–19. Petitioner quotes Ravi’s disclosure that the retransmission procedure of Figure 12:

may also be practiced with the prioritization of retransmission based on data types of the data packets. For example, since parent I frames are needed to render dependent child P frames, data packets which include I frame(s) *should be assigned higher priority for transmission and/or retransmission* over data packets which include only P frame(s).

Id. at 17 (quoting Ex. 1005, 12:23–29) (emphasis by Petitioner). Further, Petitioner quotes Ravi’s disclosure that “[d]ata-type adaptability can also be incorporated into the selective retransmission protocol . . . if there is a missing P frame which is sequentially located just before an I frame, it may be expedient to drop the missing P frame and skip to the next I frame in buffer 366.” *Id.* at 17–18 (quoting Ex. 1005, 12:56–61). Patent Owner provides no counterarguments regarding limitation 1.2.3. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches limitation 1.2.3.

f. [1.2.4.] making a retransmission decision, based on bit rates of previously received data packets

i. Parties’ Arguments and Institution Decision

(1) Petition

In the Petition, Petitioner argues that Ravi and Goetz teach limitation 1.2.4. Pet. 19–26. According to Petitioner, Ravi teaches that, if a skipped packet is not found in the playout buffer, computer 240 computes a Round_Trip_Time for the missing data packet # n+1. *Id.* at 19 (citing Ex. 1005, 11:53–60). Further, Petitioner asserts that Ravi then determines whether there is sufficient time to reasonably execute a timely retransmission. *Id.* at 19–20. Petitioner argues that this teaches to an ordinarily skilled artisan that Ravi’s retransmission decision is based on bit rates of previously received data packets. *Id.* at 20. Further, Petitioner asserts that “bit rate is a measure of ‘speed at which binary digits are transmitted’ or the ‘streaming speed of digital content on a network.’” *Id.* (quoting Ex. 1003 ¶ 82). Petitioner argues that because Ravi’s retransmission decision is “based on an estimate of how long it will take to receiving the missing data packet,” an ordinarily skilled artisan “would have understood

that decision is based on the speed at which that content will be received over the network after examining the speed at which previous content was received.” *Id.* at 21.

Further, Petitioner argues that “for the client to determine the Round_Trip_Time for the missing data packet, it must estimate the time it will take to send the retransmission request and receive the packet in response.” Pet. 21. Petitioner continues: “[t]he client knows the size of the retransmission request, and it knows the size of the missing data packet.” *Id.* Further, Petitioner argues that Ravi’s client “knows, or can estimate, how long previous packets have taken for transmission, because Ravi’s clients keep statistics on previous Round_Trip_Time values.” *Id.* According to Petitioner, thus Ravi teaches its retransmission decision is based on bit rates of previously received data packets. *Id.* at 22.

Petitioner further argues that the combination of Ravi and Goetz teaches making a retransmission decision based on bit rates of previously received data. Pet. 24. Petitioner asserts that “Ravi considers whether there is sufficient time to reasonably execute a timely retransmission as indicated in Figure 12 at step 1240.” *Id.* (citing Ex. 1005, Fig. 12, 11:61–67). Further, Petitioner argues that “[t]o the extent Ravi does not explicitly teach that this determination considers the bit rates of previously received data packets as recited, Goetz teaches this.” *Id.* (emphasis omitted). Petitioner further asserts that “in determining whether the retransmission of certain packets should occur, and with reference to its Figure 13, Goetz considers a ‘set of statistics’ including ‘bit rate throughput’ that is determined at a client ‘by monitoring and analyzing UART [universal asynchronous receiver

transmitter] interrupts to determine, or infer, the modem's throughput measured as a bit rate.” *Id.* (quoting Ex. 1006, 14:4–20).

According to Petitioner, “Goetz further explains that the ‘retransmit logic’ described in Figure 13 ‘utilizes statistics gathered on the network’ and Goetz ‘implements the statistics gathering function in the client 910.’” Pet. 24 (quoting Ex. 1006, 4:51–52; 13:56–60). Petitioner also argues that an ordinarily skilled artisan would understand that “Goetz teaches making its retransmission decision based on bit rates of previously received data packets because Goetz determines to retransmit a packet at step 1370 of Figure 13.” *Id.* at 25 (emphasis omitted). Petitioner asserts that “[a] prerequisite to step 1370 is a determination at step 1310, ‘where an inference is checked to see if there is a modem or similarly related network performance problem. This inference is created from a detected decrease in throughput (e.g., bit rate) without a corresponding detection of significant packet loss.’” *Id.* (quoting Ex. 1006, 14:24–29) (emphasis omitted).

Petitioner argues that the reasons it gave for combining Ravi and Goetz for limitation 1.2.2 would have motivated an ordinarily skilled artisan to make the same combination for limitation 1.2.4. Pet. 26.

(2) Preliminary Response

In its Preliminary Response, Patent Owner asserted that Ravi does not disclose how its round trip time is calculated and whether the calculation involves bit rates of previously received packets. Prelim. Resp. 45.¹¹ Patent Owner argued that a simple look up table could be used to estimate the round

¹¹ In our Institution Decision, we encouraged the parties to submit expert testimony expressly addressing certain issues. Inst. Dec. 17 n.9. Here, we summarize arguments in the Preliminary Response that provide context for that encouragement.

trip time of a missing packet. *Id.* Patent Owner asserted that, therefore, Ravi's estimation of round trip time does not necessarily require knowledge of the bit rates of previously received data packets. *Id.* at 48.

(3) Institution Decision

In our Institution Decision, we preliminarily determined that although Petitioner had not shown that Ravi discloses calculating bit rates (*see* Ex. 2005 ¶ 41), limitation 1.2.4 does not require the calculation of bit rates. Inst. Dec. 17.¹² We preliminarily determined that the limitation requires that the transmission decision be based on bit rates of previously received data. *Id.* We preliminarily found that slower bit rates lead to longer round trip times; faster bit rates lead to shorter round trip times. *Id.* (citing Ex. 1003 ¶¶ 82–85; Ex. 1018, 226). We noted that although the cited testimony by Dr. Houh implicitly supports those propositions, we encouraged the parties to submit expert testimony at trial that would expressly address these propositions. *Id.* at 17 n.9. As indicated, Petitioner submitted a declaration from Dr. Houh with its Petition, and Patent Owner had submitted a declaration from Dr. Kaputa with its Preliminary Response. Exs. 1003, 2005.

(4) Patent Owner Response

Patent Owner argues that Ravi does not teach limitation 1.2.4. PO Resp. 9–29. Patent Owner asserts that Ravi is silent as to how its round trip time is calculated. *Id.* at 11. According to Patent Owner, Ravi appears to

¹² In our Institution Decision, we encouraged the parties to submit expert testimony expressly addressing certain issues. Inst. Dec. 17 n.9. Here, we summarize some preliminary determinations in the Institution Decision that provide context for that encouragement. Further, we set forth the issues for which we encouraged the parties to provide further expert testimony.

describe sampling round trip times, rather than computing them. *Id.* (citing Ex. 1005, 8:55–62). Patent Owner asserts that this distinction is important because it allows Ravi to have the client make decisions concerning whether to request retransmission using round trip time alone as the decision criteria. *Id.* (citing Ex. 1005, 1:53–60).

Patent Owner argues that the Petition does not clearly specify how Ravi teaches limitation 1.2.4. PO Resp. 11. According to Patent Owner, Petitioner appears to be relying on an inherency argument for the limitation. *Id.* (citing Pet. 21). Patent Owner argues that Ravi does not have an inherent disclosure of the limitation. *Id.* at 11–12. According to Patent Owner, Ravi is concerned with the time it will take to receive a missing packet and not the speed, i.e., bit rate, at which the previous packets were received. *Id.* at 12 (citing Ex. 2005 ¶¶ 35–39). Further, Patent Owner argues that “[w]hile speed and time can be related mathematically, determining time, as in Ravi, is not equivalent to, nor does it require, making determinations based on bit rates.” *Id.* at 12 (emphasis omitted).

Patent Owner argues that the Institution Decision recognized that Ravi does not disclose calculating bit rates. PO Resp. 12. Patent Owner, however, disagrees with the analysis in the Institution Decision regarding limitation 1.2.4, arguing that analysis “misses the point and reads important limitations out of the claim.” *Id.* at 12–13. Patent Owner further asserts that “claim 1 recites specific criteria for the retransmission decision; one of which is bit rates of previously received data packets.” *Id.* (citing Ex. 1001, 8:13–25) (emphasis omitted). Patent Owner continues “the retransmission decision is made based on these bit rates, not on some other criteria that might be computed using bit rates.” *Id.* Further, Patent Owner asserts that “[in] fact,

because Ravi does not explicitly describe how round trip times are calculated at all, one cannot say that bit rates of previously received data packets play any role whatsoever in a client deciding whether or not to request retransmission of a missing packet in Ravi.” *Id.* Patent Owner argues that the Comer reference demonstrates that sampling can be used to estimate round trip times, rather than bit rates. *Id.* (citing Ex. 2005 ¶ 43).

Patent Owner disputes Dr. Houh’s testimony that, in Ravi, the client knows the size of the retransmission request. PO Resp. 14. Further, Patent Owner argues that a simple look up table could be used to estimate the round trip time of a missing packet. *Id.* at 15. Patent Owner asserts that, therefore, Ravi’s estimation of round trip time does not necessarily require knowledge of the bit rates of previously received data packets. *Id.* at 16. Patent Owner further asserts that Ravi does not teach or suggest making a transmission decision based on bit rates of previously received data packets when describing prioritizing retransmissions. *Id.* at 17. Patent Owner argues that Petitioner conflates frame rates of a data source with rates at which packets are received across a network channel. *Id.* (citing Ex. 2005 ¶ 49). According to Patent Owner, [t]hese rates need not be the same, and will not be the same if, for example, information loss occurs in the network.” *Id.* (quoting Ex. 2005 ¶ 49). Patent Owner further argues that “[i]n no sense is the bit rate of a previously received data packet considered when deciding whether to prioritize an 18 kbps stream over a 14 kbps stream or vice-versa.” *Id.* (quoting Ex. 2005 ¶ 49).

Patent Owner also argues that Petitioner fails to clearly articulate why an ordinarily skilled artisan would have combined Ravi and Goetz to arrive at the subject matter of claim 1. PO Resp. 17–18. Patent Owner reasserts that

making a determination about whether or not to request retransmission based on a packet's round trip time is not the same as making such a decision based on bit rates of previously received data packets. *Id.* at 18 (citing Ex. 2005

¶ 35). Patent Owner argues:

A round trip time is a measure of what it says—time. Round trip times are typically expressed in terms of seconds or fractions thereof. Bit rates, on the other hand, are not measures of time. Rather, they are measures of speed, calculated by determining a number of bits received per unit of time.

Id. (citing Ex. 1017, 52, 126). Patent Owner asserts that these metrics are not interchangeable. *Id.* Further, Patent Owner argues that an ordinarily skilled artisan “would understand that a ‘round trip time’ and a ‘received bit rate’ are two very different factors of a communication system, and a ‘round trip time’ need not necessarily be calculated based on bit rates of previously received data packets.” *Id.*

Regarding Goetz, Patent Owner argues that “even if Goetz could be read as informing [an ordinarily skilled artisan] that a modem's throughput could be measured as a bit rate, . . . that knowledge would not change the fact that Ravi does not employ such bit rates as a specific decision criterion for requesting (or not) retransmission of a missing packet.” PO Resp. 19 (citing Ex. 2005 ¶ 47). Further, Patent Owner asserts that “Ravi's use of past measures of round trip time as the decision criterion is instead both sufficient and markedly more efficient.” *Id.*

Patent Owner further argues that Petitioner does not explain why an ordinarily skilled artisan would have been motivated to modify Ravi to make a retransmission decision based on bit rates of previously received data packets. PO Resp. 19–20. Patent Owner argues that Petitioner addresses

how the combination is possible, but not why an ordinarily skilled artisan would have been motivated to make the combination. *Id.* at 20.

Patent Owner also argues that the underlying philosophy of Goetz is to make a transmission or retransmission decision based on the network resources (i.e., the channel bandwidth). PO Resp. 22. Patent Owner asserts that would not have motivated an ordinarily skilled artisan to modify Ravi to “make a retransmission decision, based on . . . bit rates of previously received data packets. *Id.*

Patent Owner further argues that if Ravi were modified based on Goetz, the combination would not lead to limitation 1.2.4. PO Resp. 23. Patent Owner asserts that in Ravi, a client computer makes requests for retransmission. *Id.* (citing Ex. 1005, 11:61–67; Pet. 19). Patent Owner continues that “[i]n Goetz, it is also a client that requests retransmission upon recognizing a packet is missing. *Id.* Patent Owner argues that it always the server that makes the decision is to whether to retransmit any missing packets. *Id.* According to Patent Owner, although a client may request retransmission of a missing packet, such a decision would be made irrespective of any inferences of network state determined by collected statistics, and irrespective of whether the statistics were collected by the client or the server. *Id.* at 25 (citing Ex. 2005 ¶ 53); *see also id.* at 27–28. According to Patent Owner, the decision as to whether a retransmission request for the missing data packet is to be sent would, therefore, not be based on any network performance statistics at all, let alone on bit rates of previously received data packets, but only based on the absence of an expected packet. *Id.* (citing Ex. 2005 ¶ 53).

Patent Owner argues that Petitioner is incorrect in asserting that “[a]lthough Goetz determines available bandwidth on the transmission end, rather than the receiving end, [an ordinarily skilled artisan] would have recognized that its teachings were applicable to Ravi’s determination on the client side.” PO Resp. 25 (quoting Pet. 29). Patent Owner argues that Ravi’s client computer does not have the data necessary to perform the determinations taught by Goetz. *Id.* Patent Owner asserts that Ravi does not maintain bit rates of received data packets. *Id.* Patent Owner further argues that it is irrelevant whether the ’038 patent describes differences in complexity between making determinations of whether to retransmit at the server or client. *Id.* at 25–26. Patent Owner argues that thus the combination of Ravi and Goetz would not include making a retransmission decision, based on channel conditions, importance of the missing data packet and bit rates of previously received data packets, as to whether a retransmission request for the missing data packet is to be sent. *Id.* at 26.

(5) Petitioner’s Reply

Petitioner argues that “Ravi’s computation of ‘a Round_Trip_Time for the missing data packet’ teaches making a retransmission decision, based on . . . bit rates of previously received data packets.” Pet. Reply 4. Petitioner asserts that Ravi’s retransmission decision is based on an estimate of how long it will take to receive a missing data packet (i.e., the Round_Trip_Time of the missing packet), which an ordinarily skilled artisan would have understood as based on the speed at which that content will be received over the network after examining the speed at which previous content was received. *Id.* (citing Pet. 19–21; Ex. 1003 ¶¶ 79–88).

Petitioner further argues that the retransmission decision in claim 1 does not have to be based *directly* on bit rates of previously data packets. Pet Reply 5. Petitioner argues that such a limitation would be inconsistent with the sole embodiment of the '038 patent that relies on the bit rate of any data. *Id.* Petitioner asserts that limitation 1.2.4 encompasses making a retransmission decision based on a value calculated from or influenced by bit rates and is not limited to making retransmission decisions based directly on bit rates. *Id.* (citing Ex. 1022 ¶¶ 8–18).

Petitioner further argues that Ravi's Round_Trip_Time is influenced by bit rates of previously received data packets and thus teaches limitation 1.2.4 even if round trip time is Ravi's decision criteria. Pet. Reply 6. Petitioner also provides examples, which it contends shows that round trip times are based on bit rates of received packets. *Id.* at 7–8. Petitioner also asserts that it did not rely on inherency for limitation 1.2.4. *Id.* at 9. Petitioner further argues that Ravi teaches computing round-trip times as well as sampling them. *Id.* at 11–12. Petitioner also argues that Ravi's teachings of retransmission decisions based on bit rates is relevant for limitation 1.2.4 in an obviousness challenge. *Id.* at 12–13.

Petitioner further argues that the Petition asserted that Ravi's description of determining priority via scalable layered description of determining priority “via a scalable layered protocol based on parameters such as resolution or frame rate” where Ravi describes giving “data packets for rendering the base (lowest) resolution” a “highest priority” and giving “additive data packets . . . lower priority” teaches limitation 1.2.4. Pet. Reply 13. Petitioner argues that this retransmission decision teaches limitation 1.2.4 because a client receiving a stream having a resolution or

frame rate of 18 kbps (i.e., the bit rates of previously received data packets is 18 kbps) will prioritize retransmission of a 14 kbps base stream. *Id.* at 12–13 (citing Pet. 23–24; Ex. 1003 ¶¶ 89–92). Petitioner argues that limitation 1.2.4 does not require that the recited bit rates of previously received data packets relate to network transmission speed. *Id.* at 14. Petitioner asserts that the term is broad enough to encompass the bit rates of a video stream. *Id.*

Petitioner also argues that Patent Owner does not contest that Goetz teaches a retransmission decision based on bit rates of previously received data packets. Pet. Reply 16 (citing PO Resp. 17). According to Petitioner, Patent Owner only contests that an ordinarily skilled artisan would combine Ravi and Goetz. *Id.* Petitioner argues that Patent Owner’s arguments against the combination of Ravi and Goetz are unavailing. *Id.*

Petitioner argues that the fact that Ravi does not employ bit rates as a specific decision criteria for requesting transmission of a missing packet is irrelevant. Pet. Reply 16. Petitioner further argues that Patent Owner’s assertion that Ravi’s use of a past measure of round trip time is more efficient than using bit rates is not credibly supported. *Id.* at 16–17. Petitioner also argues that Patent Owner is wrong when it contends that Petitioner does not explain why the reasons for modifying Ravi to make a retransmission decision determination based on channel conditions would necessary constitute reasons to modify Ravi to make a retransmission decision based on bit rates of previously received data packets. *Id.* at 17.

Petitioner argues that both Ravi and Goetz teach retransmission techniques. Pet. Reply 17 (citing Ex. 1003 ¶¶ 103–104). Petitioner further asserts that Ravi acknowledges that its algorithm can be modified and Goetz teaches retransmission techniques that would increase the likelihood that a

presentation will include more media information and improve the quality of the presented media. *Id.* (citing Ex. 1003 ¶ 103; Ex. 1006, 15:17–23).

Petitioner also argues that Ravi notes a desire for “improved techniques for reliable and efficient transmission of multimedia streams to client(s) which efficiently utilize the network resources available” and it does so, in part, “to better match the varying bandwidth capacity of the network connection.” *Id.* at 18 (citing Ex. 1005, 2:64–67, 6:41–47). Petitioner further argues that Goetz shares this motivation: quoting Goetz’s disclosure that the “underlying philosophy [] that, if the network resources are available, then they should be utilized to increase the likelihood that the presentation will include more of the media information.” *Id.* (citing Ex. 1006, 15:17–23). Petitioner further asserts that the overlapping goals of the two references are achieved through the use of the same components. *Id.* at 18–19 (citing Ex. 1022 ¶¶ 56–62).

Petitioner further argues that Patent Owner contends that the underlying philosophy of Goetz relates only to bandwidth or channel conditions and that contention is incorrect. Pet. Reply 19. Petitioner asserts that Patent Owner reproduces a portion of Goetz, which notes the “throttle up operations transmit, or retransmit, certain packets if bandwidth is available” and argues this does not incorporate bit rates of previously received data packets. *Id.* (quoting Ex. 1006, 15:17–23). Petitioner argues that Goetz’s Figure 13 explains that the throttle up determination does not occur until after a bit rate[] determination (step 1310). *Id.* (citing Ex. 1022 ¶¶ 57–58).

Petitioner argues that, therefore, the “throttle up” operations cause retransmission “if bandwidth is available” after considering bit rates of previously received data packets. *Id.* According to Petitioner, thus, Goetz’s

underlying philosophy also relies upon bit rates of previously received data packets. *Id.*

Petitioner asserts that Patent Owner is wrong when it argues that the Ravi-Goetz combination would not lead to the claimed invention. Pet. Reply 21. According to Petitioner, Patent Owner is arguing that, in combining Ravi and Goetz, an ordinarily skilled artisan would have ignored Ravi's client-side retransmission decisions in favor of Goetz's server-side decisions. *Id.* at 21. Petitioner further asserts that Patent Owner is mistaken when it argues that Ravi's client computer does not have the data necessary to preform the determinations taught by Goetz. *Id.* at 21–22. Petitioner asserts that Ravi's client computer has the data and ability to perform calculations to indicate whether bandwidth would be decreased or increased and thus has the ability to make a retransmission decision based on a determination of bandwidth. *Id.* Petitioner also argues that it is irrelevant whether Ravi maintains bit rates of received data packets because limitation 1.2.4 does not require such maintenance. *Id.* at 22. Petitioner further argues that, although in Goetz alone, the server always decides whether to fulfill a client's retransmission request, Petitioner relied on Ravi's client-side determination regarding retransmission and incorporated Goetz's teachings to show that one or two of the claimed factors were known and would have been obvious to incorporate into Ravi's client-drive retransmission determination. *Id.* at 22.

(6) Patent Owner's Sur-reply

Patent Owner argues that Petitioner admits that Ravi's retransmission is based on an estimate of how long it will take to receive a missing data packet. PO Sur-reply 1. Patent Owner asserts that Ravi is silent as to how

that round trip time estimate is determined. *Id.* at 1–2. Patent Owner further argues that Ravi indicates that “client computer 240 dynamically adjusts the transmission rate of the data stream to optimize usage of the bandwidth capacity of the network connection.” *Id.* at 2 (citing Ex. 1005, 6:64–66). Further, Patent Owner asserts that transmission rate is selected from among a plurality of possible bit rates. *Id.* (citing Ex. 1005, 7:7–10). Patent Owner further argues that Ravi is silent as to how the round trip time estimate is determined. *Id.* at 1–2. Further, Patent Owner argues that even if Ravi computes round trip times using bit rates, the client computer selects the bit rates, and those bit rates are not based on previously received data packets. *Id.* at 2. Patent Owner further asserts that Petitioner does not explain why an ordinarily skilled artisan would substitute any teachings of Goetz in place of Ravi’s teachings of having client computer 240 dynamically adjust the transmission rate of the data stream to optimize usage of the bandwidth capacity of the network connection. *Id.* Patent Owner asserts that even assuming bit rate considerations are present in a Ravi-Goetz combination, those considerations would be addressed through bit rate selection, and therefore the bit rate selection, and not bit rates of previously received data packets, would consequently inform the round trip time used to determine whether or not to request retransmission of a missing packet. *Id.*

Patent Owner argues that in any combination of Ravi and Goetz, it would be the server and not the client that decides whether to transmit any missing packets. Pet. Reply 3. Patent Owner asserts that the client would always send a request and leave it to the server to decide whether to fill the request. *Id.* (citing Ex. 1006, 12:54–58, 13:10–14:3). According to Patent Owner, “the decision as to whether a *retransmission request* for the missing

data packet is sent would *not* be based on *any* network performance statistics at all, let alone on bit rates of previously received data packets, but only based on the absence of an expected packet.” *Id.* (citing Ex. 1006, 12:54–58, 13:10–14:3). Patent Owner further asserts that “[i]t would be up to the server to decide whether or not to fulfill the request, but in any event, this would be a very different method than that recited in the challenged claims.” *Id.* (citing Ex. 1006, 12:54–58, 13:10–14:3, ¶¶ 55–56¹³).

ii. Analysis

We have considered the parties’ arguments, the testimony of both experts, and the other evidence of record and determine that Petitioner has proven that Ravi teaches or suggests limitation 1.2.4. We further determine that Petitioner has proven that the combination of Ravi and Goetz teaches limitation 1.2.4 and that an ordinarily skilled artisan would have been motivated to make the combination and would have had a reasonable expectation of success in so doing.

(1) Ravi Teaches or Suggests Limitation 1.2.4

We determine that Petitioner has proven that Ravi’s disclosure of retransmission decisions using estimates of round trip time teaches or suggests limitation 1.2.4.

First, Ravi calculates estimated round trip times. Dr. Houh and Dr. Kaputa have differing opinions on whether Ravi calculates estimated round trip times. Ex. 1003 ¶ 84; Ex. 1022 ¶ 43; Ex. 2005 ¶¶ 40–41.

¹³ This citation is unclear, as Exhibit 1006 does not appear to have numbered paragraphs. Likely, the cite was intended to be to Exhibit 2005, the Declaration of Dr. Kaputa, which does have numbered paragraphs. Further, in paragraph 55 of Exhibit 2005, Dr. Kaputa addresses Goetz’s teachings regarding limitation 1.2.4.

Dr. Houh testifies that Ravi calculates estimated round trip times. Ex. 1003 ¶ 84; Ex. 1022 ¶ 43. Dr. Kaputa testifies that Ravi may just use lookup tables to provide its estimates of round trip times and not perform any calculations. Ex. 2005 ¶¶ 40–41. We credit Dr. Houh’s testimony on this issue. Ravi discloses that its client “computes” round trip time. Ex. 1005, 11:53–56; Ex. 1022 ¶ 43. Ravi further discloses computing its performance variables. Ex. 1005, 7:16–18; Ex. 1022 ¶ 43. Further, Ravi, does not disclose the use of a lookup table. Ex. 1022 ¶ 45. In addition, we credit Dr. Houh’s testimony that if Ravi were merely using a lookup table to estimate a round trip time, it would not say that it computes the estimated round trip time. Ex. 1022 ¶ 44. Accordingly, we determine that Ravi computes the estimated round trip times. Ex. 1003 ¶ 84; Ex. 1022 ¶ 43.

Second, Ravi teaches making a retransmission decision based on an estimate of round trip time from when a retransmission request is sent to a server and the time a copy of the missing data packet is received at the client computer in response to the transmission request. Ex. 1003 ¶¶ 79–81. Figure 12 of Ravi “is a flow chart illustrating selective retransmission” of “missing data packets for just-in-time (JIT) reliability.” Ex. 1005, 4:13–14, 11:42–45. In the process of Figure 12, if a skipped packet is not found in a playout buffer, computer 240 computes a Round_Trip_Time for the missing data packet # n+1. *Id.* at 11:53–56. “The Round_Trip_Time is an estimate of the time beginning from the time a retransmission request is sent to stream server 220 till the time a copy of the missing data packet 240 is received at client computer in response to the retransmission request (step 1230).” *Id.* at 11:56–60. “If there is sufficient time to reasonably execute a timely retransmission, e.g., the difference between the timestamp of the missing data

packet and the timestamp of the currently displayed data packet is greater than the Round_Trip_Time (step 1240), then client computer 240 sends a request to server 220 for a retransmission of the missing data packet (step 1250).” *Id.* at 11:61–67. Thus, Ravi teaches making a retransmission decision based on an estimate of round trip time for a missing packet. Ex. 1003 ¶¶ 79–83.

Third, although Ravi does not expressly explain how it calculates estimated round trip times, those estimates are based on bit rates of previously received data packets. Ex. 1003 ¶ 82. A bit rate is a measure of “speed at which binary digits are transmitted” (Ex. 1017, Microsoft Computer Dictionary 4th ed.) or the “streaming speed of digital content on a network” (Ex. 1019, Microsoft Computer Dictionary 5th ed.¹⁴). Ex. 1003 ¶ 82. As Dr. Houh explains, this means that Ravi’s retransmission decision is based on the speed at which that content will be received over the network after examining the speed at which previous content was received (i.e., the receiver estimates how long a future packet will take to receive with knowledge of how long it took to receive previous packets). *Id.* ¶ 83. Slower bit rates lead to longer round trip times; faster bit rates lead to shorter round trip times. Ex. 1022 ¶ 32. As Dr. Houh sets forth, with 50 Kb video packets and 1 Kb transmission requests, if the bit rate for a network is 50 Kbps, the round trip time would be approximately 1.02 seconds, excluding additional

¹⁴ Dr. Houh testifies that although the 5th edition of the Microsoft Computer Dictionary was published in 2002, a POSITA would have recognized this definition of “bit rate” as the “streaming speed of digital content on a network” to be applicable at the time of the ’038 Patent’s May 2000 priority date. Ex. 1003 ¶ 82 n.3. Patent Owner has not disputed this testimony. *See generally* PO Resp.; Ex. 2005.

propagation and queuing delays. *Id.* ¶ 39. If the bit rate speed is 100 Kbps, then the round trip transmission is 0.51 seconds, excluding additional propagation and queuing delays. *Id.* ¶ 40. Thus, the round trip transmission at 50 Kbps is significantly slower than that at 100 kbps. *Id.* As a result, if the time stamp difference for the packets is 1.00 seconds, the retransmission request would occur with the 100 Kbps bit rate, but not with the 50 Kbps bit rate. *Id.* ¶ 42. Thus, Ravi's retransmission decision based on an estimate of round trip time is a retransmission decision based on bit rates of previously received data packets. Ex. 1003 ¶ 82; Ex. 1022 ¶ 42.

Dr. Kaputa testifies that Ravi's estimated round trip times are not based on bit rate speed because time and speed are different parameters. Ex. 2005 ¶ 35. We agree with Dr. Kaputa that time and speed are different parameters, but, as set forth above, that does not mean that round trip time is not based on bit rate speed (e.g., faster bit rates lead to shorter round trip times). To support his contrary opinion, Dr. Kaputa provides an example of a swimming relay with four swimmers. *Id.* ¶¶ 37–39. Dr. Kaputa opines that the total time it takes the swimmers to execute the relay is not based on an individual swimmer's speed. *Id.* We, however, do not find this example apt because the example does not demonstrate a disconnect between time and speed, rather it shows a lack of a proportional relationship between aggregate time and the speed of an individual swimmer. With Ravi, the issue is the relationship between round trip time and a bit rate, not an aggregate round trip time and multiple bit rates. Dr. Kaputa has not identified in Ravi multiple bit rates with multiple transmissions (e.g., the equivalent of legs on a relay) that would be aggregated to create a round trip time. The retransmission at issue is a single transmission. Thus, the example with four

swimmers is not apt to the issue in dispute with Ravi. Further, the example with four swimmers is unpersuasive for another reason. Even in that example, the total time for the relay is influenced by the speed of an individual swimmer: the faster that individual swims, the shorter total relay time. Ex. 1022 ¶ 47. Although the total relay time does not depend exclusively on an individual's speed—the speed of the other swimmers also influence it—limitation 1.2 makes clear that factors other than just bit rate influence the retransmission decision. Ex. 1001, 8:17–21 (“making a retransmission decision, based on channel conditions, importance of missing data packets”); Ex. 1022 ¶ 47. Thus, although in limitation 1.2 the retransmission decision is not based exclusively on bit rate, the retransmission decision is still based on the bit rate (just like the relay time is based on an individual's swimmer's speed, but not exclusively based on that speed). Therefore, we are persuaded that Ravi's estimate of round trip time is based on bit rates.

Fourth, although Ravi does not expressly disclose calculating estimated round trip times using bit rates, limitation 1.2.4 does not recite calculating round trip times using bit rates. All that the limitation requires is that the retransmission decision be based on bit rates, and, as set forth above, estimated round trip times (and hence Ravi's retransmission decisions) are based on bit rates. Further, a calculation of estimated round-trip time suggests using bit rates for the calculation because round trip time depends on bit rates and the calculation using bit rates of round-trip time is a straight forward calculation for an ordinarily skilled artisan. Ex. 1003 ¶ 83; Ex. 1022 ¶¶ 37–41.

Fifth, Dr. Houh testifies that other disclosures in Ravi also teach or suggest limitation 1.2.4: dynamically adjusting transmission rates and prioritization based on frame rates. Ex. 1003 ¶¶ 87, 89–92. Dr. Kaputa, however, disagrees with this testimony. Ex. 2005 ¶¶ 44–45, 48–49. We do not need to resolve this disagreement between the experts because we find that Ravi’s disclosure of estimated round trip times teaches or suggests limitation 1.2.4. Thus, it does not matter whether Ravi’s disclosure of dynamically adjusting transmission rates and prioritization based on frame rates also teach or suggest the limitation.

Sixth, Dr. Houh testifies that the disclosure of Goetz supports a finding that Ravi by itself teaches limitation 1.2.4. Ex. 1003 ¶ 87. Dr. Kaputa disagrees. Ex. 2005 ¶¶ 46–47. We do not need to resolve this disagreement between the experts because, as set forth above, we find that, without considering Goetz’s disclosure, Ravi teaches or suggests limitation 1.2.4.

Seventh, Dr. Houh testifies that Comer supports a finding that Ravi by itself teaches limitation 1.2.4. Ex. 1003 ¶ 87. Dr. Kaputa disagrees, arguing that Comer supports the opposite finding. Ex. 2005 ¶¶ 42–43. We do not find that Comer’s disclosure supports or detracts from a finding that Ravi teaches or suggests limitation 1.2.4. Dr. Houh testifies that Comer accommodates varying internet delays by monitoring the performance of each connection and that this monitoring relies on round trip sample time. Ex. 1003 ¶ 29. Dr. Kaputa testifies that Comer describes estimating round trip times based on saved time information. Ex. 2005 ¶ 43. We do not find either expert statement to be probative as to whether Ravi by itself teaches or suggests limitation 1.2.4.

Eighth, Patent Owner provides some arguments regarding Ravi's teachings and limitation 1.2.4 for which Patent Owner did not cite the testimony of Dr. Kaputa. For that reason, these arguments were not addressed above in our discussion of the experts' testimony and the other evidence of record. We, however, address these arguments here. Patent Owner argues that "Ravi appears to describe 'sampling' round trip times, rather than 'computing' them" and characterizes a discussion in Ravi as "discussing sampling of round trip times for use in determining whether or not a Round_Trip_Time_Bit should be set." PO Resp. 11. We disagree. As discussed above, Ravi discloses that its client "computes" round trip time. Ex. 1005, 11:53–56; Ex. 1022 ¶ 43. Further, Ravi uses the term "sample" in a manner different than "compute." Ex. 1022 ¶ 43; Ex. 1005, 7:48–60, 8:56–60, Figs. 8 and 12. Also, this argument by Patent Owner rests heavily on unsupported attorney argument, which is not evidence. *Icon Health & Fitness, Inc. v. Strava Inc.*, 849 F.3d 1034, 1046 (Fed. Cir. 2017) ("Attorney argument is not evidence or explanation in support of a conclusion."); *Invitrogen Corp. v. Clontech Lab., Inc.*, 429 F.3d 1052, 1068 (Fed. Cir. 2005) ("Unsubstantiated attorney argument regarding the meaning of technical evidence is no substitute for competent, substantiated expert testimony.").

Patent Owner also argues that Petitioner relies on the doctrine of inherency to establish that Ravi teaches or suggests limitation 1.2.4. PO Resp. 1, 11. Petitioner argues that it does not rely on inherency for this limitation. Pet. Reply 9. We agree with Petitioner. Petitioner's showing relies on what Ravi expressly teaches or suggests to an ordinarily skilled artisan based on the knowledge of an ordinarily skilled artisan, not on what

inherently would occur from practicing Ravi's disclosure. *See* Pet. 19–26; Pet. Reply 4–23.

In sum, we find that the evidence of record shows that Ravi teaches or suggests limitation 1.2.4. Ex. 1003 ¶¶ 79–84, 88, 98; Ex. 1022 ¶¶ 32–48.

(2) The Combination of Ravi and Goetz Teaches or Suggests Limitation 1.2.4.

We determine that Petitioner has proven that the combination of Ravi and Goetz teaches or suggests limitation 1.2.4 and that an ordinarily skilled artisan would have been motivated to combine Ravi's and Goetz's teachings and would have had a reasonable expectation of success in so doing.

As discussed in Section III.B.3.f.ii.(1) above, Ravi does not expressly disclose using bit rates directly to calculate estimated round trip time and thus does not expressly disclose using bit rates directly to make a retransmission decision. As set forth in Section II.B.1.b, we do not construe limitation 1.2.4 as requiring that bit rates be used directly to make a retransmission decision. Nevertheless, Goetz discloses directly using bit rates to make a retransmission decision and the combination of Ravi and Goetz also teaches or suggests limitation 1.2.4 with the partial construction set forth in Section II.B.1.b. and would also teach or suggest that limitation even if we accepted Patent Owner's argument that limitation 1.2.4 required the direct use of bit rates in making a retransmission decision.

First, as discussed above, the process of Figure 12 of Ravi determines whether there is sufficient time to reasonably execute a timely retransmission. Ex. 1003 ¶ 93; Ex. 1005, 11:61–67, Fig. 12 (step 1240). Goetz teaches or suggests using bit rates to make such a determination. Ex. 1003 ¶ 93. Specifically, in determining whether the retransmission of certain packets should occur, and with reference to its Figure 13, Goetz

considers a “set of statistics” including “bit rate throughput” that is determined at a client “by monitoring and analyzing UART interrupts to determine, or infer, the modem’s throughput measured as a bit rate.”

Ex. 1006, 14:4–20; Ex. 1003 ¶ 94. Goetz further explains that the “retransmit logic” described in its Figure 13 “utilizes statistics gathered on the network” and Goetz “implements the statistics gathering function in the client 910.”

Ex. 1006, 4:51–52, 13:56–60; Ex. 1003 ¶ 94. Further, in step 1370 of Figure 13, Goetz determines whether to retransmit a packet. Ex. 1006, 14:24–67, Fig. 13; Ex. 1003 ¶ 95. A prerequisite to step 1370 in Goetz is a determination at step 1310, “where an inference is checked to see if there is a modem or similarly related network performance problem. This inference is created from a detected decrease in throughput (*e.g., bit rate*) without a corresponding detection of significant packet loss.” Ex. 1006, 14:24–29 (emphasis added); Ex. 1003 ¶ 96; Ex. 1022 ¶¶ 57–58. We credit Dr. Houh’s testimony that because Goetz’s statistics are gathered in the client, they are based on received data packets and thus the retransmission decision in Goetz is based on bit rates of previously received data packets. Ex. 1003 ¶ 97.

Although Goetz makes its retransmission decisions on the transmission end, rather than the receiving (client) end, Goetz’s teachings are still applicable to the transmission decision made at Ravi’s client. Ex. 1003 ¶ 105; Ex. 1022 ¶ 62. Ravi’s client computer has the data necessary to perform the determinations taught by Goetz. Ex. 1003 ¶ 105 (citing Ex. 1005, 7:16–25). Further, the data necessary for detecting random packet loss, as disclosed in Goetz, is present at the receiving end, which suggests using that data at the client itself to make a retransmission decision. *Id.* Dr. Kaputa opines that the combination of Ravi and Goetz would always

make a retransmission decision based on bit rates on the server end, rather than the client end, because Goetz always makes its retransmission decision on the server end. Ex. 2005 ¶¶ 51–55. We disagree. Dr. Kaputa provides no reason why Goetz’s teachings, which are exemplified in a server-based decision, would not be applicable to Ravi’s client-based decision, whereas Dr. Houh has provided persuasive reasons why they would. *Id.*; Ex. 1003 ¶ 105; Ex. 1022 ¶ 62. Further, bodily incorporation is not the standard for obviousness. *In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Second, an ordinarily skilled artisan would have combined the teachings of Ravi and Goetz based on motivations provided by those references. Ex. 1003 ¶ 103; Ex. 1022 ¶ 61. In Ravi, an overarching consideration in making a retransmission decision is whether there is sufficient time to reasonably execute a timely resubmission. Ex. 1005, 11:61–67; Ex. 1003 ¶ 103. Ravi acknowledges that its algorithm can be modified. Ex. 1005, 12:36–37; Ex. 1003 ¶ 103. Further, Ravi’s goals include “reducing network traffic . . . and further improving network efficiency.” Ex. 1005, 12:5–12; Ex. 1003 ¶ 103. Goetz sets forth a similar goal, noting that its “underlying philosophy is that, if the network resources are available, then they should be utilized to increase the likelihood that the presentation will include more of the media information.” Ex 1006, 15:17–23; Ex. 1003 ¶ 104. In other words, Goetz motivates an ordinarily skilled artisan to incorporate a bandwidth measure in making retransmission decisions so that the end-user’s presentation includes more information, which in turn provides an improved media presentation. Ex. 1003 ¶ 104. For example, delivering more media information to the user results in a higher quality presentation (e.g., a presentation with higher resolution, or a

presentation without substantial skips, or a presentation with fewer blocking artifacts). *Id.* Thus, we determine that an ordinarily skilled artisan would have been motivated to combine Ravi's and Goetz's teachings. *Id.*; Ex. 1022 ¶ 61.

Third, an ordinarily skilled artisan would have had a reasonable expectation of success in combining Ravi's and Goetz's teachings. *Id.* Ravi and Goetz use similar hardware to make retransmission decisions. Ex. 1022 ¶ 62; Ex. 1005, 4:28–5:30; Ex. 1006, 1059–60. In addition, received bandwidth measurement techniques and equations were well known. Ex. 1022 ¶ 62 (citing Ex. 1026, 4:8–34, 13:11–17:37; Ex 1027, 10:28–46, 12:62–13:4).

Fourth, Patent Owner provides a few arguments regarding the combination of Ravi and Goetz in which it did not cite the testimony of Dr. Kaputa and thus were not addressed above in our discussion of the experts' testimony. We address those arguments here. Patent Owner argues that Petitioner has only shown that an ordinarily skilled artisan *could* have combined Ravi and Goetz. PO Resp. 2. We disagree. Although Dr. Houh testifies that Ravi teaches that its algorithm could be modified (and the ability to modify the algorithm is a relevant inquiry for an obviousness analysis), as set forth above, Dr. Houh set forth actual motivations for modifying Ravi's algorithm.

Patent Owner argues that Ravi's client computer does not have the data necessary to perform the determinations taught by Goetz. PO Resp. 25. Patent Owner cites no expert testimony to support this assertion, and unsupported attorney argument is not evidence. *Id.*; *Icon Health*, 849 F.3d

1046; *Invitrogen Corp.*, 429 F.3d at 1068. Further, we credit the contrary expert testimony by Dr. Houh. Ex. 1022 ¶ 62.

Patent Owner contends that the underlying philosophy of Goetz relates only to making a retransmission decision based on bandwidth or channel conditions and thus an ordinarily skilled artisan would not have combined Ravi and Goetz and reach the claimed invention. PO Resp. 21–22. We disagree. To support this contention regarding bandwidth and channel conditions, Patent Owner reproduces a portion of Goetz, which notes the “throttle up operations transmit, or retransmit, certain packets if bandwidth is available” and argues this does not incorporate bit rates of previously received data packets. *Id.* (quoting Ex. 1006, 15:17–23). Figure 13 of Goetz, however, makes clear that the throttle up determination (step 1370) in Goetz does not occur until after a bit rate determination (step 1310). Ex. 1006, Fig. 13; Ex. 1022 ¶¶ 57–58. Further, as discussed above, we credit the contrary testimony by Dr. Houh that Goetz’s underlying philosophy supports combining Ravi’s and Goetz’s teachings. Ex. 1003 ¶ 104; Ex. 1022 ¶ 61.

Patent Owner asserts that, even assuming bit rate considerations are present in a Ravi-Goetz combination, those considerations would be addressed through bit rate selection, and therefore the bit rate selection, and not bit rates of previously received data packets, would consequently inform the round trip time used to determine whether or not to request retransmission of a missing packet. PO Resp. 2. Patent Owner cites no evidence to support this assertion. *Id.* Instead, Patent Owner relies on unsupported attorney argument, which is not evidence. *Id.*; *Icon Health*, 849 F.3d at 1046; *Invitrogen Corp.*, 429 F.3d at 1068. Further, we credit Dr. Houh’s contrary testimony that Goetz’s bit rate disclosures would have encouraged an ordinarily skilled

artisan to combine Ravi and Goetz in the manner proposed. Ex. 1003 ¶ 104; Ex. 1022 ¶¶ 61–62.

In sum, we determine that Petitioner has proven that the combination of Ravi and Goetz teaches or suggests limitation 1.2.4, that an ordinarily skilled artisan would have been motivated to combine their teachings, and that an ordinarily skilled artisan would have had a reasonable expectation in so doing. Ex. 1003 ¶¶ 93–98; Ex. 1022 ¶¶ 56–62.

g. [1.3] sending the retransmission request to the transmitter if the retransmission decision is affirmative

Petitioner argues that Ravi teaches limitation 1.3. Pet. 31. Petitioner asserts that Ravi discloses that “if a retransmission is possible (i.e., if the retransmission decision is affirmative), the ‘client computer 240 sends a request to server 220 for a retransmission of the missing data packet.’” *Id.* (quoting Ex. 1005, 11:61–67) (emphasis omitted). Patent Owner provides no counterarguments regarding limitation 1.3. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches limitation 1.3.

h. [1.4] receiving a packet retransmitted by the transmitter in response to the retransmission request.

Petitioner argues that Ravi teaches limitation 1.4. Pet. 32. Petitioner asserts that Ravi’s Round_Trip_Time estimation uses “the time a copy of the missing data packet is received at client computer 240 in response to the retransmission request.” *Id.* at 33 (quoting Ex. 1005, 11:56–60) (emphasis omitted). Petitioner further argues that Ravi also describes “retransmitted (lost) packets” that are “inserted in their originally sequential order” which indicates that the packets retransmitted by the transmitter are receiv[ed]. *Id.* (quoting Ex. 1005, 6:55–58) (emphasis omitted) (alteration by Petitioner).

Further, Petitioner asserts that an ordinarily skilled artisan “would have recognized that it was well-known that the purpose of sending such a retransmission request is so that the client computer receiv[es] a packet retransmitted by the transmitter in response to the retransmission request.” *Id.* (emphasis omitted) (alteration by Petitioner). Patent Owner provides no counterarguments regarding limitation 1.4. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Ravi teaches limitation 1.4.

i. Summary

In sum, Petitioner has proven, by a preponderance of the evidence, that claim 1 would have been obvious over Ravi and Goetz.

4. Claim 2: [2.1] wherein the channel conditions include an available channel bandwidth

Claim 2 recites the method of claim 1 with limitation 2.1 set forth above. Petitioner argues Goetz teaches limitation 2.1, asserting that “Goetz collects statistics that ‘indicate that the network has available bandwidth’ in its determination of whether retransmission is to occur.” Pet. 36 (quoting Ex. 1006, 14:45–54). Patent Owner provides no counterarguments regarding limitation 2.1. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Goetz teaches limitation 2.1. Thus, Petitioner has proven, by a preponderance of the evidence, that claim 2 would have been obvious over Ravi and Goetz.

5. Claim 3: [3.1] wherein the channel conditions include a channel transmission delay.

Claim 3 recites the method according to claim 1 with limitation 3.1 set forth above. Petitioner argues that Goetz teaches limitation 3.1. Pet. 36. Petitioner asserts that Goetz collects multiple statistics to determine whether

retransmission should occur, including round trip delay. *Id.* (citing Ex. 1006, 13:58–64). Petitioner further argues that a “‘round-trip delay’ statistic encompasses a delay in both transmission and receipt; thus, Goetz teaches that the channel conditions include a channel transmission delay as recited.” *Id.* (citing Ex. 1003 ¶¶ 122–125) (emphasis omitted). Patent Owner provides no counterarguments regarding limitation 3.1. *See generally* PO Resp. After reviewing the record, we determine that Petitioner proven that Goetz teaches limitation 3.1. Thus, Petitioner has proven, by a preponderance of the evidence, that claim 3 would have been obvious over Ravi and Goetz.

6. Claim 4: [4.1] wherein the channel conditions include a channel bit error rate

Claim 4 recites the method according to claim 1 with limitation 4.1 set forth above. Petitioner argues that Goetz teaches or renders obvious limitation 4.1. Pet. 37. Petitioner asserts that “[p]rior to the bandwidth determination at step 1370 of Figure 13 . . . Goetz considers whether there is a network-based problem (step 1330).” *Id.* Petitioner argues that Goetz describes that “[t]his inference is created from detecting a significant packet loss.” *Id.* (quoting Ex. 1006, 14:28–31) (alteration by Petitioner). Petitioner further argues that Goetz’s teaching of detecting a significant packet loss renders obvious a channel bit error rate. *Id.* (citing Ex. 1001, 2:2–4; Ex. 1003 ¶¶ 126–130). Patent Owner provides no counterarguments regarding limitation 4.1. *See generally* PO Resp. After reviewing the record, we determine that Petitioner proven that Goetz teaches or suggests limitation 4.1. Thus, Petitioner has proven, by a preponderance of the evidence, that claim 4 would have been obvious over Ravi and Goetz.

C. Asserted Obviousness over Ravi, Goetz, and Rhee

Petitioner asserts that claim 5 would have been obvious over the combination of Ravi, Goetz, and Rhee. Pet. 5.

1. Rhee

Rhee describes a “new retransmission-based error control technique” that “yields good error resilience for interactive video conferencing.” Ex. 1007, code (57). Rhee teaches that if “one or more packets were lost, a NACK [No Acknowledgement] is sent and retransmission of the lost packets is requested.” *Id.* at 9:24–26.

2. Claim 5: [5.1] wherein the retransmission request is a NACK (non-acknowledgment) packet

Claim 5 recites the method according to claim 1 with limitation 5.1 set forth above. Petitioner argues that Rhee teaches limitation 5.1. Pet. 38. Petitioner quotes Rhee’s disclosure that if “one or more packets are lost, a NACK is sent and retransmission of the lost packets is requested.” *Id.* (quoting Ex. 1007, 9:24–26). Petitioner asserts that an ordinarily skilled artisan would have been motivated to combine this teaching of Rhee with Ravi because doing so would have been nothing more than the use or application of a known technique to a known method. *Id.* Further, Petitioner asserts that “Ravi discloses a retransmission request, describes operation in packet networks (e.g., the Internet), and acknowledges that the retransmission request could take the form of a packet.” *Id.* at 38 (citing Ex. 1005, 5:49–51, 11:67–12:4). Petitioner continues that “Rhee provides teachings of a specific type of packet that could be used for the retransmission request of Ravi—a NACK or no acknowledgement packet.” *Id.* (citing Ex. 1007, 9:24–26). Further, Petitioner asserts that “[an ordinarily skilled artisan] would have found it obvious to apply this teaching of Rhee in Ravi’s methods, as doing

so would have been no more than a slight modification to the type of packet described in Ravi, which would have been recognized as common at the time of the '038 Patent.” *Id.* (citing Ex. 1003 ¶¶ 137–138).

Patent Owner provides no counterarguments regarding limitation 5.1 or the combination of Rhee with Ravi and Goetz. *See generally* PO Resp. After reviewing the record, we determine that Petitioner has proven that Rhee teaches limitation 5.1 and that an ordinarily skilled artisan would have been motivated to combine Rhee with Ravi and Goetz and had a reasonable expectation of success in so doing. Ex. 1003 ¶¶ 135–138. Thus, Petitioner has proven, by a preponderance of the evidence, that claim 5 would have been obvious over Ravi, Goetz, and Rhee.

D. Asserted Obviousness over Zhu and over the Combination of Zhu and Radha

Petitioner asserts that claims 1–4 would have been obvious over Zhu and that claim 5 would have been obvious over the combination of Zhu and Radha. Pet. 5. In light of our determinations that Petitioner has proven that claims 1–4 are unpatentable over the combination of Ravi and Goetz and that claim 5 is unpatentable over the combination of Ravi, Goetz, and Rhee, we do not need to address Petitioner’s challenge to claims 1–4 as unpatentable over Zhu or Petitioner’s challenge to claim 5 as unpatentable over the combination of Zhu and Radha. *See SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1359 (2018) (holding that a petitioner “is entitled to a final written decision addressing all of the claims it has challenged”); *Bos. Sci. Scimed, Inc. v. Cook Grp. Inc.*, 809 F. App’x 984, 990 (Fed. Cir. 2020) (non-precedential) (recognizing that the “Board need not address issues that are not necessary to the resolution of the proceeding” and, thus, agreeing that the Board has

“discretion to decline to decide additional instituted grounds once the petitioner has prevailed on all its challenged claims”).

IV. MOTION TO EXCLUDE

Petitioner moves to exclude Exhibit 2005, the Declaration of Dr. Kaputa. Paper 20. This Motion to Exclude is moot because, as set forth above, even when we consider the testimony of Dr. Kaputa, we determine that Petitioner has proven that every challenged claim is unpatentable. Thus, Petitioner’s Motion to Exclude is dismissed as moot.

V. CONCLUSION

As set forth in the following table, Petitioner has proven, by a preponderance of the evidence, that all of the challenged claims are unpatentable:¹⁵

Claim(s)	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4	103(a)	Ravi, Goetz	1–4	
5	103(a)	Ravi, Goetz, Rhee	5	

¹⁵ Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this decision, we draw Patent Owner’s attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. See 84 Fed. Reg. 16,654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. See 37 C.F.R. § 42.8(a)(3), (b)(2).

Claim(s)	35 U.S.C. §	References	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–4	103(a)	Zhu ¹⁶		
5	103(a)	Zhu, Radha ¹⁷		
Overall			1–5	

VI. ORDER

It is:

ORDERED that claims 1–5 of the '852 patent are unpatentable under 35 U.S.C. § 103;

FURTHER ORDERED that Petitioner's Motion to Exclude is dismissed as moot; and

FURTHER ORDERED that this Decision is final, and a party to this proceeding seeking judicial review of the Decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

¹⁶ Because we determined that Petitioner proved that claims 1–4 would have been obvious over Ravi and Goetz, we do not need to address Petitioner's challenge to claims 1–4 as obvious over Zhu.

¹⁷ Because we determined that Petitioner proved that claim 5 would have been obvious over Ravi, Goetz, and Rhee, we do not need to address Petitioner's challenge to claim 5 as obvious over Zhu and Radha.

IPR2021-00852
Patent 6,877,038 B2

For PETITIONER:

Raghav Bajaj
David McCombs
Angela Oliver
HAYNES & BOONE LLP
raghav.bajaj.ipr@haynesboone.com
david.mccombs.ipr@haynesboone.com
angela.oliver.ipr@haynesboone.com

Ashraf Fawzy
Jung Hahm
Roshan Mansinghani
UNIFIED PATENTS, LLC
afawzy@unifiedpatents.com
jung@unifiedpatents.com
roshan@unifiedpatents.com

For PATENT OWNER:

Tarek Fahmi
Holly Atkinson
Jonathan Tsao
ASCENDA LAW GROUP, P.C.
tarek.fahmi@ascendalaw.com
holly.atkinson@ascendalaw.com
jonathan.tsao@ascendalaw.com