

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

U.S. Patent 6,877,038

PETITION FOR *INTER PARTES* REVIEW OF
U.S. PATENT 6,877,038
CHALLENGING CLAIMS 1–5

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PETITIONER’S EXHIBIT LIST

EX1001	U.S. Patent 6,877,038 to Hakenberg et al.
EX1002	Prosecution File History of U.S. Patent 6,877,038 (“’038 PH”)
EX1003	Declaration of Dr. Henry H. Houh
EX1004	Curriculum Vitae of Dr. Henry H. Houh
EX1005	U.S. Patent 6,292,834 to Ravi et al. (“ <i>Ravi</i> ”)
EX1006	U.S. Patent 5,956,729 to Goetz et al. (“ <i>Goetz</i> ”)
EX1007	U.S. Patent 6,104,757 to Injong Rhee (“ <i>Rhee</i> ”)
EX1008	U.S. Patent 5,768,527 to Zhu et al. (“ <i>Zhu</i> ”)
EX1009	Plaintiff’s Amended Complaint for Patent Infringement, <i>Sovereign Peak Ventures, LLC v. LG Electronics, Inc.</i> (E.D.Tex)
EX1010	Order, <i>Sovereign Peak Ventures, LLC v. LG Electronics, Inc.</i> (E.D.Tex) (Nov. 25, 2020)
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EX1013	U.S. Patent 6,629,318 to Radha et al. (“ <i>Radha</i> ”)
EX1014	Joint Agreed Motion to Extend the Time for Plaintiff to Serve Preliminary Infringement Contentions and for Defendants to Serve Preliminary Invalidity Contentions, <i>Sovereign Peak Ventures, LLC v. TCL Technology Group Corp.</i> (E.D.Tex)
EX1015	Declaration of Kevin Jakel
EX1016	RFC 2357
EX1017	Microsoft Computer Dictionary (4 th ed.) (excerpts)
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EX1021	Order, <i>Sovereign Peak Ventures, LLC v. TCL Technology Group Corp.</i> (E.D.Tex)

I. MANDATORY NOTICES UNDER 37 C.F.R. § 42.8

A. Real Party-in-Interest

Pursuant to 37 C.F.R. § 42.8(b)(1), Unified Patents, LLC (“Unified” or “Petitioner”) certifies that Unified is the real party-in-interest, and further certifies that no other party exercised control or could exercise control over Unified’s participation in this proceeding, the filing of this petition, or the conduct of any ensuing trial. In view of *Worlds Inc. v. Bungie, Inc.*, 903 F.3d 1237, 1242–44 (Fed. Cir. 2018), Unified has submitted voluntary discovery in support of its certification. See EX1015 (Declaration of Kevin Jakel).

B. Related Matters

As of the filing date of this Petition, and to the best knowledge of Petitioner, the ’038 Patent is or has been involved in the following matters:

Case Caption	Number
<i>Sovereign Peak Ventures, LLC v. LG Electronics, Inc.</i> (E.D. Tex.) (complaint filed May 7, 2020 (EX1009); dismissed with prejudice Nov. 25, 2020 (EX1010))	2:20-cv-00109
<i>Sovereign Peak Ventures, LLC v. TCL Technology Group Corp.</i> , (E.D. Tex.) (complaint filed Jan. 13, 2021 (EX1011))	2:21-cv-00008

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II. CERTIFICATION OF GROUNDS FOR STANDING

Petitioner certifies pursuant to Rule 42.104(a) that the patent for which review is sought is available for *inter partes* review and that Petitioner is not barred or estopped from requesting an *inter partes* review challenging the patent claims on the grounds identified in this Petition.

III. OVERVIEW OF CHALLENGE AND RELIEF REQUESTED

Pursuant to Rules 42.22(a)(1) and 42.104(b)(1)–(2), Petitioner challenges claims 1–5 (“Challenged Claims”) of the ’038 Patent.

A. Prior Art Patents

The ’038 Patent claims priority to a European Patent Application filed March 2, 2000. The following references are pertinent to the grounds of unpatentability explained below:

1. U.S. Patent 6,292,834 to Ravi et al. (filed March 14, 1997, issued September 18, 2001) (“*Ravi*” (EX1005)), which is prior art under at least 35 U.S.C. § 102(e).¹
2. U.S. Patent 5,956,729 to Goetz et al. (filed September 6, 1996, issued September 21, 1999) (“*Goetz*” (EX1006)), which is prior art under at least 35 U.S.C. § 102(a).
3. U.S. Patent 6,104,757 to Injong Rhee (filed May 15, 1998, issued August 15, 2000) (“*Rhee*” (EX1007)), which is prior art under at least 35 U.S.C. § 102(e).
4. U.S. Patent 5,768,527 to Zhu et al. (filed April 23, 1996, issued June 16,

¹ The ’038 Patent issued from an application filed prior to the enactment of the America Invents Act (“AIA”). Thus, the pre-AIA statutory framework applies.

1998) (“*Zhu*” (EX1008)), which is prior art under at least 35 U.S.C. § 102(b).

5. U.S. Patent 6,629,318 to Radha et al. (filed August 2, 1999, issued September 30, 2003) (“*Radha*” (EX1013)), which is prior art under at least 35 U.S.C. § 102(e).

Ravi is related to U.S. Patent 5,918,002 to Klemets et al., which was cited by the applicant during prosecution (*see* ’038 PH (EX1002), p. 192) and which is listed on the face of the ’038 Patent. However, the examiner never applied Klemets during prosecution, and as explained below in § VII, the Board should not exercise its discretion to deny the Petition based on § 325(d).

Zhu was cited and applied by the examiner during prosecution of the ’038 Patent, but for the reasons set forth below in § VII, the Board should not exercise its discretion to deny the Petition based on § 325(d), because the examiner erred in allowing the claims over *Zhu*.

Goetz, *Rhee*, and *Radha* were not cited during prosecution of the ’038 Patent.

B. Statutory Grounds for Challenges

This Petition, supported by the declaration of Dr. Henry Houh (“Houh Declaration” or “Houh” (EX1003)), requests cancellation of claims 1–5 under the Grounds listed below:

Ground #1: Claims 1–4 of the ’038 Patent are obvious under 35 U.S.C. § 103(a) over *Ravi* in view of *Goetz*.

Ground #2: Claim 5 of the '038 Patent is obvious under 35 U.S.C. § 103(a) over *Ravi* in view of *Goetz* further in view of *Rhee*.

Ground #3: Claims 1–4 of the '038 Patent are obvious under 35 U.S.C. § 103(a) over *Zhu* in view of the knowledge of a POSITA.

Ground #4: Claim 5 of the '038 Patent is obvious under 35 U.S.C. § 103(a) over *Zhu* in view of the knowledge of a POSITA further in view of *Radha*.

IV. U.S. PATENT 6,778,038

A. Summary

The '038 Patent is directed to a “method and apparatus for transmitting and receiving video data arranged in data frames forming a data stream.” '038 Patent (EX1001), Abstract. In the '038 Patent, “[o]nce a data frame has been transmitted through an unreliable channel and has not been received at the receiver, the priority level of the missing data frame is compared with a priority threshold value, and is then retransmitted if its priority level is greater than the priority threshold value.” *Id.* In the '038 Patent, this “retransmission decision is performed either at the transmitting or at the receiving side.” *Id.* The '038 Patent also clarifies that the “priority decision may involve the calculation of the priority threshold value based on a measurement of the available channel bandwidths and eventually on the bit rate of previously sent frames.” *Id.*

Independent claim 1 reads:

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

deciding that a data packet is missing;

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;

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

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

In the Abstract of the '038 Patent, a “retransmission decision is performed at the transmitting or at the receiving side.” '038 Patent (EX1001), Abstract. However, the claims appear to be directed to making the retransmission decision at the receiving side, given the context of the preamble, which recites *receiving data packets from a transmitter*, and the limitation that recites *sending the retransmission request to the transmitter*.² But the majority of the '038 Patent's disclosure focuses on making a retransmission decision at the transmitting side (e.g., at a server), with only a few portions dedicated to making a retransmission decision at the receiving side. See '038 Patent (EX1001), 3:39–48; 7:53–8:1.

Importantly, in the claims, the “retransmission decision” is made based on three factors: (1) *channel conditions*; (2) *importance of the missing data packet*; and (3) *bit rates of previously received data packets*. But the '038 Patent does not provide any description of how the receiver determines the *bit rates of previously received data packets* as recited. Rather, the '038 Patent describes only a variable

²Unless otherwise specified, all **bold** emphasis below has been added. Text in *italics* is used to signify claim language, while reference names are also *italicized*.

“Bs” that refers to “the bit rate of the **sent frames**” and is calculated based on two sent frames, using the transmission times and lengths of those two frames. There is no variable that provides detail on or corresponds to the *bit rates of previously received data packets* is recited in claim 1.

And, in any event, prior to the '038 Patent's priority date, methods for intelligently requesting retransmission of a missing data packet were well-known. Such methods considered the current conditions of a network channel between the transmitter and receiver, as well as the importance of such data packets. Thus, the '038 Patent's concepts and methods simply restate transmission techniques that were well-known to persons of skill in the art prior to the alleged priority date. The prior art presented in this Petition (as supported by the declaration of Dr. Houh) disclose or render obvious all elements of the challenged claims, as discussed below.

B. Level of Ordinary Skill in the Art

A person of ordinary skill in the art at and before the priority date for the '038 Patent (“POSITA”) 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. Less experience may be necessary with additional education (*e.g.*, a Master's degree); likewise, less education may be necessary with additional work experience (*e.g.*, 4–5 years). Houh (EX1003), ¶¶ 43–46.

C. Prosecution History

The '038 Patent issued from U.S. Patent Application Number 10/633,574 (“the '574 Application”), which was filed August 5, 2003. The '574 Application is a division of U.S. Patent Application Number 09/796,759, filed March 2, 2001. The '574 Application claims priority to European Patent Application 00104388.4, filed March 2, 2000. *See* '038 PH (EX1002), p. 181.

The '574 Application was filed with a preliminary amendment containing claims that, in most respects, closely match the issued claims of the '038 Patent. *See id.* at 186. These claims were initially rejected as anticipated by *Zhu*. *See* EX1002 at 40. In response to the rejection, the applicant amended the claims: prior to the amendment, the claim recited “making a retransmission decision based on channel conditions and importance of the missing data packet” but responsive to the rejection, the applicant narrowed the claim to additionally require that the decision was based on “bit rates of previously received data packets,” such that the claim recited “making a retransmission decision based on channel conditions, importance of the missing data packet and bit rates of previously received data packets.” *Id.* at 27.

making a retransmission decision, based on channel ~~conditions and~~ 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;

In the remarks, the applicant alleged:

“the decision of whether to send a retransmission request is based on, among other things, the bit rates of previously received data packets. Therefore, in accordance with the present invention, the server and the receiver advantageously account for a bit rate that has resulted in successfully received data packets. The bit rates of previously received data packets is valuable information that may be used to dynamically optimize the transmission bandwidth to increase the likelihood of successfully transmitting data packets. Consequently, basing the decision on whether to send a retransmission request on, among other things, the bit rates of previously received data packets improves the performance of the system and enables a dynamically adaptable transmission quality in response to changing channel conditions.”

Id. at 32. The applicant further alleged that this feature was not disclosed or suggested by *Zhu*, based on the Office Action’s citations to *Zhu* at column 5, line 48 to column 6, line 14. According to the applicant, a “key aspect of the reference [*Zhu*] is to determine whether or not to request a retransmission...based on a predetermined bandwidth budget, the estimated information loss rate on the packet network, ‘the importance of the lost packet and the remaining number [of] allowed retransmission attempts for the packet.’ However, *Zhu* does not disclose or suggest that the retransmission decision is based on **bit rates of previously received data packets**, as recited in each of independent claims 13 and 19.” *Id.* at 32–33 (emphasis in original). The examiner subsequently issued a Notice of Allowance, without providing any reasons for allowance.

But the applicant and examiner failed to recognize that the features argued by the applicant were known in the prior art, as evidenced by, *inter alia*, *Ravi* and *Goetz*. Additionally, the applicant only argued against the isolated portions of *Zhu* identified by the examiner but overlooked other disclosure of *Zhu* that taught the allegedly-distinguishing features. As demonstrated below, other portions of *Zhu* that were not distinguished by the applicant teach the allegedly missing elements. The prior art cited herein teaches every limitation of the challenged claims and thus renders the challenged claims unpatentable.

D. Priority Date

For purposes of this proceeding, Petitioner assumes a priority date of March 2, 2000 (*i.e.*, the filing of the European application).

V. CLAIM CONSTRUCTION

The challenged claims of the '038 Patent are construed herein “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) (Nov. 13, 2018). Petitioner respectfully submits that all claim terms should have their ordinary and customary meaning as understood by one of ordinary skill in the art.

VI. CLAIMS 1–5 ARE UNPATENTABLE

A. Ground 1: *Ravi* and *Goetz* render claims 1–4 obvious

1. Overview of *Ravi*

Ravi describes an “efficient transmission protocol for transmitting multimedia streams from a server to a client computer.” *Ravi* (EX1005), Abstract. In *Ravi*, a “transmission rate” may be “dynamically matched to the available bandwidth of a network connection between the server and the client computer.” *Id.* at Abstract.

As relevant to the challenged claims, *Ravi* describes a method with a corresponding flowchart “illustrating the selective retransmission of the present invention.” *Id.* at 4:13–14, 11:42–12:11. In *Ravi*’s method, the “client computer 240 selectively requests retransmission of ‘missing’ data packets” which is further described below in the limitation-by-limitation analysis of claim 1. *Id.* at 11:42–45.

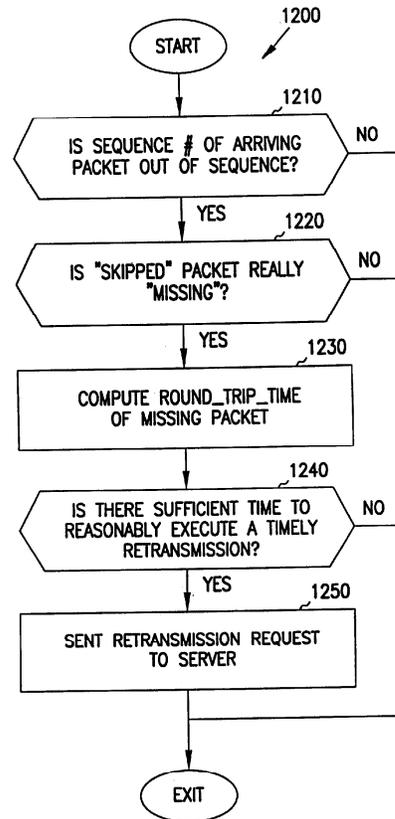


FIG. 12

***Ravi* (EX1005), Figure 12**

Ravi is analogous art to the '038 Patent, because it is in the same field of endeavor of retransmission of missing data packets. Houh (EX1003), ¶ 59. *Ravi* is also pertinent to a problem the '038 Patent tries to solve: packet loss occurring during video transmission. See '038 Patent (EX1001), 2:2–4 (“packet loss occurs”); *Ravi* (EX1005), 2:40–45 (“causing packets to be discarded/lost and requiring retransmission....”); Houh (EX1003), ¶ 59.

2. Overview of *Goetz*

Goetz relates to “real-time multimedia applications and, more particularly, to

the streaming of real-time multimedia information over a communication network.”

Goetz (EX1006), 1:27–31. *Goetz* is analogous art to the '038 Patent, because it too is in the same field of endeavor of retransmission of missing data packets. Houh (EX1003), ¶ 63 (citing, e.g., *Goetz* (EX1006), 12:54–55 (“If the client detects a lost packet it may send to the server a retransmission request for the missing packet.”)). *Goetz* is also pertinent to a problem the '038 Patent tries to solve: packet loss occurring during video transmission. See '038 Patent (EX1001), 2:2–4 (“packet loss occurs”); *Goetz* (EX1006), 1:58–62 (“In network-based contexts...data may be lost...”); Houh (EX1003), ¶ 63.

3. Analysis

Claim 1

[1.0] A method for receiving data packets from a transmitter, said method comprising:

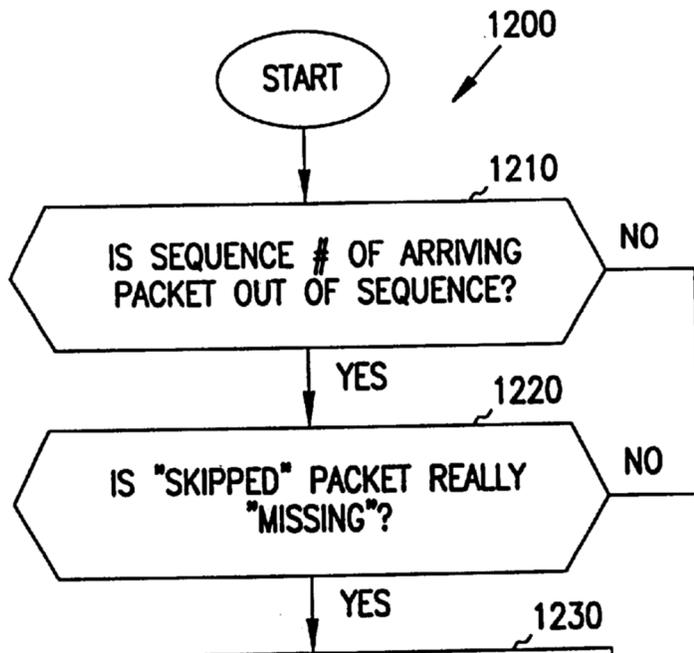
To the extent the preamble is limiting, *Pacing Techs., LLC v. Garmin Intern., Inc.*, 778 F. 3d 1021, 1023–1024 (Fed. Cir. 2015) (preambles are not normally limiting), *Ravi* discloses or at least renders it obvious. *Ravi* states that the “present invention is directed at the efficient and reliable streaming of **data packets** from stream server 220 to client computer 240” where the “stream server 220” corresponds to the recited *transmitter*. *Ravi* (EX1005), 6:31–36; see also *id.*, 11:42–52 (“data packets arrive at client computer 240”); Abstract (“transmitting multimedia streams from a server to a client computer”). Thus, *Ravi* discloses

receiving data packets from a transmitter. Houh (EX1003), ¶¶ 64–66.

[1.1] deciding that a data packet is missing;

Ravi discloses, or at least renders obvious, this claim limitation.

In describing Figure 12, *Ravi* describes that, “[i]f 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 # $n+1$.” *Ravi* (EX1005), 11:42–60.**



Ravi (EX1005), Fig. 12 (excerpt)

Thus, by describing the determination that a skipped data packet is missing, *Ravi* discloses, or at least renders obvious, *deciding that a data packet is missing*. Houh (EX1003), ¶¶ 67–69.

[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;

The combined teachings of *Ravi* and *Goetz* render obvious this limitation.

First, *Ravi* discloses *making a retransmission decision...as to whether a retransmission request for the missing data packet is to be sent*. After it determines that a data packet is missing, *Ravi* describes 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.” *Ravi* (EX1005), 11:61–67; Houh (EX1003), ¶ 71.

As demonstrated below, *Ravi* discloses that this *retransmission decision* is based on ... [1.2.3] *importance of the missing data packet* as well as [1.2.4] *bit rates of previously received data packets*. *Goetz* provides teachings of making a *retransmission decision* based on [1.2.2] *channel conditions*.

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

Ravi discloses 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).” *Ravi* (EX1005), 12:23–29; *see also* 12:30–35 (“data packets for rendering the base (lowest) resolution is given the highest priority while additive data packets for improving the base resolution are given lower priority.”); 12:49–55 (“late retransmission of a missing annotation stream packet, which includes **important HTML flip(s)**, may be preferred to dropping the important annotation

stream packet.”); 12:56–61 (“Data-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.”); Houh (EX1003), ¶¶ 73–74.³

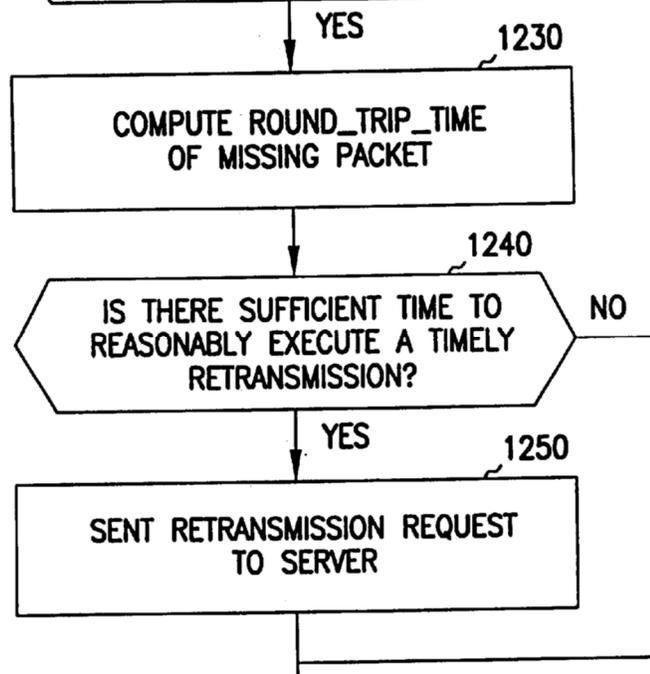
A POSITA would have recognized that *Ravi*’s prioritization of retransmission teaches a *retransmission decision, based on ... importance of the missing data packet*, because prioritizing the retransmission of certain packets is a *decision* related to retransmission, and the ’038 Patent does not limit the types of decisions made in its embodiments. Houh (EX1003), ¶¶ 75–76. Additionally, the examples described in *Ravi* are consistent with at least one example in the ’038 Patent, which describe that “according to the present invention I-frames have been given the highest priority” and subsequent P-frames are given lower priority. See ’038 Patent (EX1001), 5:24–36.

³ The ’038 Patent alleges that its invention “goes beyond the teaching of the prior art in that not only I-frames may be retransmitted.” ’038 Patent (EX1001), 3:26–28. However, this does not distinguish over the teachings of *Ravi*, as *Ravi* does not limit its retransmission to only I-frames; rather, a POSITA would have recognized that *Ravi* contemplates retransmission of other types of frames, including P-frames. Houh (EX1003), ¶ 77.

Thus, by describing the prioritization of certain types of packets for retransmission, *Ravi* teaches making a retransmission decision based on *importance of the missing data packet* as recited. Houh (EX1003), ¶¶ 73–78.

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

Ravi teaches that, if a skipped packet is not found in the playout buffer and 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).” *Ravi* (EX1005), 11:53–60. *Ravi* continues and explains that “[i]f 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 11:61–67.



Ravi (EX1005), Fig. 12 (excerpt)

This teaches, to a POSITA, that *Ravi*'s retransmission decision is based on *bit rates of previously received data packets*. A POSITA would have understood that bit rate is a measure of “speed at which binary digits are transmitted” or the “streaming speed of digital content on a network.” Houh (EX1003), ¶ 82 (citing Microsoft Computer Dictionary (4th ed.) (EX1017); Microsoft Computer Dictionary (5th ed.) (EX1019)⁴). Here, *Ravi*'s retransmission decision is based on the

⁴ Although the 5th edition of the Microsoft Computer Dictionary was published in 2002, a POSITA would have recognized the definition of “bit rate” as the “streaming speed of digital content of a network” to be applicable at the time of the '038 Patent's May 2000 priority date. Houh (EX1003), ¶ 82.

“Round_Trip_Time for the missing data packet.” *Ravi* (EX1005), 11:53–60. In other words, *Ravi*’s retransmission decision is based on an estimate of how long it will take to receive the missing data packet, which a POSITA 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 (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). Houh (EX1003), ¶ 83.

That is, 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. The client knows the size of the retransmission request, and it knows the size of the missing data packet. Houh (EX1003), ¶ 84. It also 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.* For example, *Ravi* describes a calculation that determines whether Round_Trip_Time exceeds a constant C18 and whether Round_Trip_Time has increased over the last four Round_Trip_Time readings taken. *See, e.g., Ravi* (EX1005), 8:50–62. In this passage, *Ravi* describes a determination of whether Round_Trip_Time has increased over the last 3 samples: “Round_Trip_Time has increased over the last C19 samples” where “C19 is 3 samples.” *Id.*

As Dr. Houh explains, *Ravi* also describes other calculations based on the time

of receipt of data packets, which confirms that *Ravi* determines the *bit rates of previously received data packets* as recited. For example, *Ravi* describes dynamically adjusting a “transmission rate of the data stream” which would correspond to the rate at which the data stream is received, which teaches the *bit rates of previously received data packets*. *Ravi* (EX1005), 6:36–41. *Ravi* also describes, in determining whether to increase or decrease bandwidth, a calculation that computes a number of bytes received by the client device, confirming that *Ravi* teaches consideration of the *bit rates of previously received data packets*. Contemporaneous prior art references (e.g., *Goetz*) also describe that determining the bit rate of received data was known. Houh (EX1003), ¶¶ 85–87 (citing *Goetz* (EX1006), 14:14–20).

Accordingly, *Ravi* teaches, to a POSITA, that its retransmission decision is based on ... *bit rates of previously received data packets* as recited. Houh (EX1003), ¶ 88.⁵ As noted above in the analysis of limitation [1.2.3], *Ravi* also describes that

⁵ *Ravi*'s discussion of the Round_Trip_Time is sufficient to teach this limitation, as it is even more detailed than the '038 Patent's disclosure of *bit rates of previously received data packets* itself. Cf. *In re Morsa*, 803 F.3d 1374, 1377 (Fed. Cir. 2015) (prior art that disclosed the claim features in the same level of detail as in the specification of the application itself was sufficient enabling disclosure for

the retransmission decision in Figure 12 “may also be practiced with the prioritization of retransmission” and thus, *Ravi* teaches a retransmission decision based on *importance of the missing data packet and bit rates of previously received data packets* as recited. *Ravi* (EX1005), 12:23–25; Houh (EX1003), ¶ 89.

Ravi also teaches making a retransmission decision *based on ... bit rates of previously received data packets* in its description of determining priority “via a scalable layered protocol based on parameters such as resolution or frame rate. For example, the data packets for rendering the base (lowest) resolution is given the highest priority while additive data packets for improving the base resolution are given lower priority.” *Ravi* (EX1005), 12:30–35. In *Ravi*, the client receives from the server data packets for various resolutions corresponding to various bit rates, e.g., “**video packets** at 1 frames/second (fps), 5 fps, 10 fps, and 15 fps for bandwidths of 4 **kbits/second** (kbps), 14 kbps, 18 kbps, and 44 kbps.” *Id.* at 6:44–47. The client requesting retransmission “based on parameters such as... frame rate” teaches making a retransmission decision *based on ... bit rates of previously received data packets*, because, for example, if the client is receiving a stream at 18 kbps (i.e., the *bit rates of previously received data packets*), but the base stream is 14 kbps, the client will give a higher priority to retransmission of the 14 kbps base stream (i.e.,

anticipation).

the client will make a retransmission decision to request retransmission of this stream), while the 18 kbps stream is given lower priority. Houh (EX1003), ¶¶ 89–92.

In the alternative, *Ravi* in view of *Goetz* teaches making a retransmission decision based on *bit rates of previously received data packets* as recited. *Ravi* considers whether there is sufficient time to reasonably execute a timely retransmission as indicated in Figure 12 at step 1240. See *Ravi* (EX1005), Figure 12, 11:61–67. To the extent *Ravi* does not explicitly teach that this determination considers the *bit rates of previously received data packets* as recited, *Goetz* teaches this. 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.” *Goetz* (EX1006), 14:4–20. *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.” *Id.* at 4:51–52; 13:56–60. A POSITA would have understood that, because *Goetz*’s statistics are gathered in the client, they are based on *received data packets*, and thus, *Goetz* teaches making a retransmission decision based on *bit rates of previously received data packets* as recited. Houh (EX1003), ¶¶ 93–97.

Further, a POSITA would have recognized 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. 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.” *Goetz* (EX1006), 14:24–29. Thus, *Goetz* provides additional teachings of making a retransmission decision *based on bit rates of previously received data packets*. Houh (EX1003), ¶¶ 93–97.

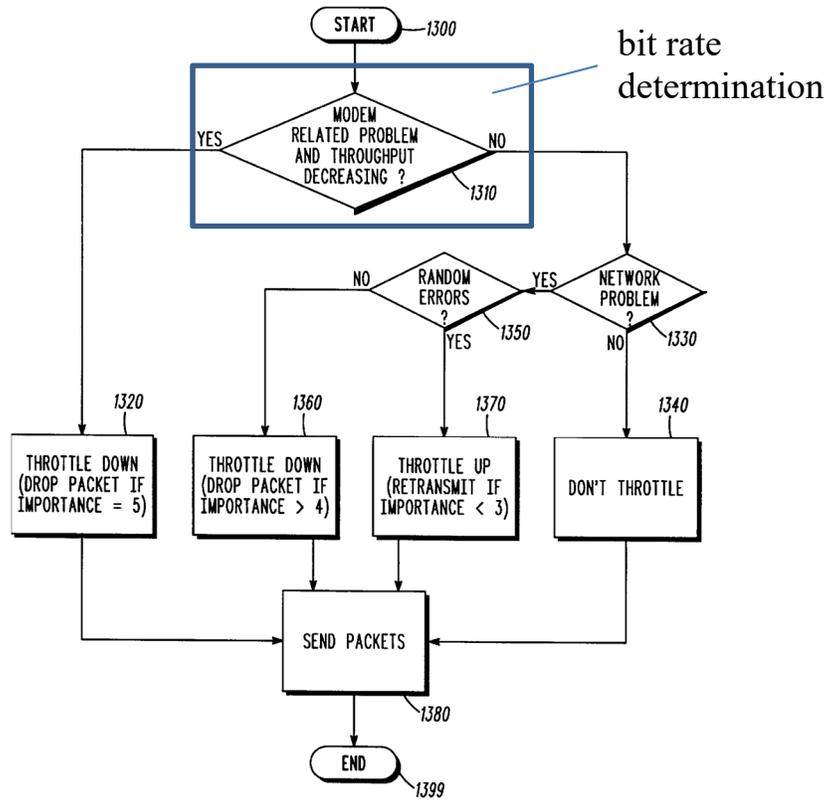


FIG.13

Reasons to combine the teachings of *Goetz* are described below with reference to the limitation reciting *making a retransmission decision, based on...channel conditions*.

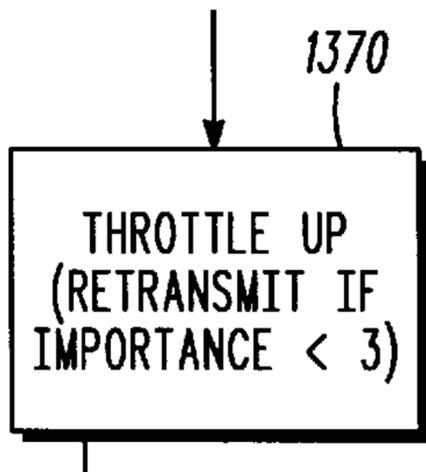
Accordingly, *Ravi*, or *Ravi* in view of *Goetz*'s teachings, render obvious *making a retransmission decision, based on ... bit rates of previously received data packets* as recited. Houh (EX1003), ¶¶ 79–98.

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

The dependent claims provide guidance on what is encompassed by the claim

term *channel conditions*. Namely, the *channel conditions* may include (but is not limited to) “an available channel bandwidth,” “a channel transmission delay”, and “a channel bit error rate.” *See* ’038 Patent (EX1001), cl. 2–4.

Goetz teaches at least making a retransmission decision based on “an available channel bandwidth” and thus teaches *making a retransmission decision, based on ... channel conditions* as recited. *Goetz* describes a process which sets “flags...to indicate that” certain packets “should be sent multiple times” and it expressly refers to sending packets multiple times as retransmission. *See Goetz* (EX1006), 14:65–67; Fig. 13; Houh (EX1003), ¶ 101.



In more detail, *Goetz* explains:

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.

Goetz (EX1006), 14:45–54. Thus, *Goetz* teaches making a retransmission decision based on whether a network has available bandwidth, which teaches *making a retransmission decision, based on ... channel conditions* as recited, where *channel conditions* include “available channel bandwidth.” *Houh* (EX1003), ¶¶ 101–102.

A POSITA would have been motivated to combine the teachings of *Goetz* with *Ravi* based on explicit motivations in the references themselves. In *Ravi*, the overarching consideration in making a retransmission decision is whether “there is sufficient time to reasonably execute a timely retransmission.” *Ravi* (EX1005), 11:61–67. *Ravi* also contemplates that “modifications to the above described algorithm” are possible. *Id.* at 12:36–37. A POSITA would have been motivated to incorporate multiple data points to make an informed decision as to whether there is sufficient time to execute a timely retransmission, and a POSITA reading *Ravi* would have looked to references in the same field for teachings of additional data points. Such teachings are provided by *Goetz*, which describes bit rate throughput and available bandwidth as considerations in determining whether to make a

retransmission decision. *Goetz* expresses a similar consideration as *Ravi*, as it notes that the “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...” *Goetz* (EX1006), 15:17–23. In other words, *Goetz* motivates a POSITA to incorporate bit rate throughput and 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. *Ravi* contemplates a multi-factor approach in determining whether to request retransmission, and thus a POSITA would have recognized the desirability in incorporating additional factors, like those disclosed in *Goetz*, to achieve *Ravi*’s goals of selectively requesting retransmission and “reducing network traffic...and further improving network efficiency” without impacting the performance of *Ravi*’s client device. *Ravi* (EX1005), 12:5–12; Houh (EX1003), ¶¶ 103–104. Thus, a POSITA would have been motivated to combine *Goetz*’s teachings with *Ravi*’s. Houh (EX1003), ¶¶ 103–104.

Although *Goetz* determines available bandwidth on the transmission end, rather than the receiving end, a POSITA would have recognized that its teachings were applicable to *Ravi*’s determination on the client side. This is at least because *Ravi* acknowledges the ability for its client computer to determine the current bandwidth (though it does not explicitly do so for retransmission purposes), as it

describes that the client computer can perform calculations to indicate whether bandwidth should be decreased or increased (*see, e.g., Ravi* (EX1005), 7:16–25), and thus, *Ravi*'s client computer has the data necessary to perform the determinations taught by *Goetz*. Further, a POSITA would have recognized that the '038 Patent does not indicate any difference in complexity between making the determination on either side, and a POSITA would have recognized that bandwidth measurement techniques at a receiving end were well-known at the time of the '038 Patent. Houh (EX1003), ¶ 105 (citing '038 Patent (EX1001), 7:57–8:2 (“it will be appreciated by the skilled person that the decision whether a missing frame is to be retransmitted may likewise be performed at the receiver.”)). Thus, a POSITA would have had a reasonable expectation of success in combining these teachings of *Goetz* with *Ravi*, and the combined teachings of *Ravi* and *Goetz* render obvious *making a retransmission decision, based on ... channel conditions*.

Accordingly, the combined teachings of *Ravi* and *Goetz* render obvious limitation [1.2], *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* as recited. Houh (EX1003), ¶¶ 99–106.

[1.3] sending the retransmission request to the transmitter if the retransmission

decision is affirmative;

Ravi discloses, or at least renders obvious, this limitation.

As detailed above in the analysis of limitation [1.2], the combination of *Ravi* and *Goetz* makes a determination to retransmit based on the factors enumerated in limitation [1.2]: *channel conditions, importance of the missing data packet, and bit rates of previously received data packets*. Houh (EX1003), ¶ 108.

If an evaluation of the factors enumerated above results in a determination to request retransmission, *Ravi* teaches *sending the retransmission request to the transmitter if the retransmission decision is affirmative*. Specifically, *Ravi* teaches 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.” *Ravi* (EX1005), 11:61–67. Thus, *Ravi* discloses *sending the retransmission request to the transmitter (the server 220) if the retransmission decision is affirmative*. Houh (EX1003), ¶ 109.

Petitioner also notes that showing that this step is present in the prior art is not needed to show that claim 1 is unpatentable, based on the Board’s precedential *Schulhauser* decision. *Ex Parte Schulhauser*, 2016 WL 6277792, at *3 (PTAB Apr. 28, 2016) (precedential). This is because the step of *sending the retransmission request to the transmitter* is conditional and only occurs *if the retransmission decision is affirmative*. According to *Schulhauser*, a method claim that includes a

conditional step can be thought of as covering two methods—one method where the condition for the step is met and the step is performed, and the second method where the condition is not met and the step is not performed. This is how claim 1 should be interpreted: when the condition for this step is met (the retransmission decision is affirmative), the step of sending a retransmission request to the transmitter is performed; by contrast, when the condition for this step is not met (the retransmission decision is negative), the step of sending a retransmission request to the transmitter is not performed. This is consistent with the '038 Patent, which states that “there is no need to send retransmission requests in those cases where the decision is denied.” '038 Patent (EX1001), 3:42–46; Houh (EX1003), ¶ 110. Thus, according to the reasoning in *Schulhauser*, if a method’s condition step does not need to be performed, it does not need to be shown to render the method claim unpatentable; accordingly, *sending the retransmission request to the transmitter* need not be met or shown in the prior *if the retransmission decision* is not affirmative. In any case, *Ravi* discloses the limitation, as set forth above.

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

Ravi discloses, or at least renders obvious, this limitation.

As described above in the analysis of limitation [1.3], if the retransmission decision is affirmative, *Ravi* describes that the client computer sends a request for a

retransmission of the missing data packet. *See Ravi* (EX1005), 11:61–67. A POSITA would have recognized that, in response to such a retransmission request, the “missing data packet” would be *retransmitted by the transmitter* and the packet would be received. Houh (EX1003), ¶¶ 112–113. This is apparent from *Ravi*, which describes, for example, that the 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.**” *Ravi* (EX1005), 11:56–60. *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.* at 6:55–58. Indeed, a POSITA 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.* *See Koninklijke Philips NV v. Google LLC*, 948 F.3d 1330, 1337 (Fed. Cir. 2020) (proper to rely on “skilled artisan’s knowledge when determining” the “differences between the claimed invention” and the prior art); Houh (EX1003), ¶¶ 114–115.

The obviousness of this limitation in light of *Ravi* is akin to the situation in *Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324 (Fed. Cir. 2007), where the Federal Circuit affirmed (in an obviousness analysis) “recourse to logic, judgment and common sense available to the person of ordinary skill that do not necessarily

require explication in any reference.” *Id.* at 1329. Here, logic, judgment and common sense, as supported by Dr. Houh’s corroborated testimony, support that *receiving a packet retransmitted by the transmitter in response to the retransmission request* is performed in *Ravi* after the client computer sends the request for retransmission of the missing data packet because this would have been basic knowledge to a POSITA. Houh (EX1003), ¶ 117 (citing Comer (EX1018), p. 213)⁶. For example, as indicated in Comer, once a sending site retransmits a lost packet, it is received by the receiver site. Comer (EX1018), p. 213.

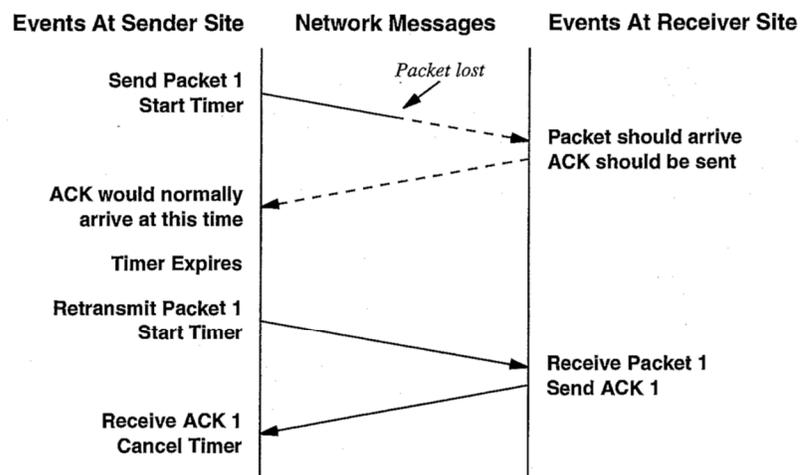


Figure 13.2 Timeout and retransmission that occurs when a packet is lost. The dotted lines show the time that would be taken by the transmission of a packet and its acknowledgement, if the packet was not lost.

Additionally, a POSITA would have recognized that two options exist

⁶ The cited version of Comer was published in January 2000. *See* EX1020 (Copyright Office registration of Comer indicating publication date).

subsequent to *Ravi*'s "client computer 240 send[ing] a request to server 220 for a retransmission of the missing data packet": (1) the client computer does not receive the missing data packet retransmitted from the server; or (2) the client computer **does receive** the missing data packet retransmitted by the server. Houh (EX1003), ¶ 116. The second option teaches, and therefore renders obvious, *receiving a packet retransmitted by the transmitter in response to the retransmission request* as recited. See *Uber Techs., Inc. v. X One, Inc.*, 957 F.3d 1334, 1339–40 (Fed. Cir. 2020) (where a POSITA would have had two equivalent known choices for a particular limitation, § 103 bars patentability of both choices).

Thus, for the reasons set forth above, *Ravi* teaches *receiving a packet retransmitted by the transmitter in response to the retransmission request*. Houh (EX1003), ¶¶ 111–118.

Petitioner also notes that this step is also conditional under *Schulhauser*, based on the analysis set forth above in limitation [1.3]. Specifically, *if the retransmission decision* is not affirmative, no retransmission request is sent, and it follows that no retransmitted packet is received in response. Thus, this step need not be shown to render claim 1 obvious.

Accordingly, *Ravi* and *Goetz* teach all limitations of claim 1, and render the claim obvious.

Claim 2

[2.1] The method according to claim 1, wherein the channel conditions include an available channel bandwidth.

Goetz discloses, or at least renders obvious, this limitation. As detailed in the analysis of limitation [1.2], *Goetz* collects statistics that “indicate that the network has available bandwidth” in its determination of whether retransmission is to occur. See *Goetz* (EX1006), 14:45–54. Thus, *Goetz* teaches that *the channel conditions include an available channel bandwidth* as recited. Houh (EX1003), ¶¶ 119–121.

Claim 3

[3.1] The method according to claim 1, wherein the channel conditions include a channel transmission delay.

Goetz discloses, or at least renders obvious, this limitation. Again, *Goetz* collects multiple statistics to determine whether retransmission should occur in its determination described with respect to Figure 13, and describes that “[t]he currently envisioned set of statistics necessary to create the inferences used by the logic of FIG. 13 include:...**round-trip delay**...” *Goetz* (EX1006), 13:58–64. A POSITA would have recognized 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. Houh (EX1003), ¶¶ 122–125.

Claim 4

[4.1] The method according to claim 1, wherein the channel conditions include a channel bit error rate.

Goetz discloses, or at least renders obvious, this limitation. Prior to the bandwidth determination at step 1370 of Figure 13 (described above in limitation [1.2]), *Goetz* considers whether there is a network-based problem (step 1330). *Goetz* states that “[t]his inference is created from detecting a significant packet loss.” *Goetz* (EX1006), 14:28–31. *Goetz*’s teaching of detecting a significant packet loss renders obvious *a channel bit error rate* at least because the ’038 Patent acknowledges as known in the prior art that “the bit error rate may increase such that packet loss occurs.” ’038 Patent (EX1001), 2:2–4; Houh (EX1003), ¶¶ 126–130. Thus, *Goetz* discloses *the channel conditions include a bit error rate* as recited.

B. Ground 2: Claim 5 is rendered obvious by *Ravi* in view of *Goetz* further in view of *Rhee*

1. Overview of *Rhee*

In pertinent part, *Rhee* describes a “new retransmission-based error control technique” that “yields good error resilience for interactive video conferencing.” *Rhee* (EX1007), Abstract. As relevant to the analysis below, *Rhee* teaches that, if “one or more packets were lost, a NACK is sent and retransmission of the lost packets is requested.” *Id.* at 9:24–26. *Rhee* is analogous art to the ’038 Patent, as it

is in the same field of endeavor of retransmission of missing data packets. *See Rhee* (EX1007), Abstract (“retransmission-based error control technique...suitable for interactive video applications.”); Houh (EX1003), ¶ 134. *Rhee* is also pertinent to the problems addressed by the ’038 Patent; for example, *Rhee* acknowledges that, in transmitting video, “packet loss is bound to occur.” *Rhee* (EX1007), 1:15–20.

2. Analysis

Claim 5

[5.1] The method according to claim 1, wherein the retransmission request is a NACK (non-acknowledgment) packet.

As noted above, *Rhee* teaches that, if a packet is lost, “a NACK is sent and retransmission of the lost packets is requested.” *Rhee* (EX1007), 9:24–26. *Rhee* provides a definition for the acronym NACK as “No Acknowledgment.” *Id.* at 7:35. Thus, *Rhee* teaches *the retransmission request is a NACK (non-acknowledgment) packet*. Houh (EX1003), ¶ 136.

A POSITA would have been motivated to combine this teaching of *Rhee* because doing so would have been no more than the use or application of a known technique to a known method. *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. *See, e.g., Ravi* (EX1005), 5:49–51; 11:67–12:4. *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. *Rhee* (EX1007), 9:24–26. A POSITA 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. Houh (EX1003), ¶¶ 137–138. For example, a POSITA would have recognized that NACK packets were known at the time of the '038 Patent, based on the POSITA's knowledge of standards-related documents. *See, e.g.* RFC 2357 (EX1016), p. 4. Thus, a POSITA would have been motivated to incorporate *Rhee*'s teachings of a NACK packet, and in combination with *Ravi* and *Goetz*, renders obvious claim 5.

C. Ground 3: *Zhu* renders obvious claims 1-4

1. Overview of *Zhu*

Zhu describes a “method for real-time streaming of a multi-media file stored in a remote server over a packet network to a multimedia client connected to the same network.” *Zhu* (EX1008), Abstract. *Zhu* is analogous art to the '038 Patent, as it is in the same field of endeavor of retransmission of missing data packets. Houh (EX1003), ¶ 141. *Zhu* is also pertinent to the problems addressed by the '038 Patent; for example, the '038 Patent alleges problems “when transmitting video data through an unreliable channel, that is, a reduced video stream quality due to a restricted

capacity” (’038 Patent (EX1001), 3:12–17) and *Zhu* similarly addresses problems of transmitting data “via a low-speed access link” to improve “quality.” *Zhu* (EX1008), Abstract; Houh (EX1003), ¶ 141.

2. Analysis

Claim 1

[1.0] A method for receiving data packets from a transmitter, said method comprising:

To the extent the preamble is limiting, *Pacing Techs.*, 778 F. 3d at 1023–1024, *Zhu* discloses or at least renders it obvious. *Zhu* describes a “scheme for real-time streaming of a multimedia file stored in a remote server over a packet network to a multimedia client.” *Zhu* (EX1008), 3:53–55. *Zhu* explains that the “multimedia file is transmitted in packets.” *Id.* at 3:61–62. Thus, *Zhu* discloses the multimedia client *receiving data packets from a transmitter* (i.e., the remote server). Houh (EX1003), ¶¶ 142–144.

[1.1] deciding that a data packet is missing;

Zhu discloses, or at least renders obvious, this claim limitation.

Zhu discloses in Figure 2 a “block diagram of one embodiment of a multimedia client device” that includes, among other components, a “packet processor (204)” which “is utilized for...**performing packet loss detection.**” *Zhu*

(EX1008), 4:49–60; *see also* 7:44–48 (“detecting a packet loss”); 13:28–29 (“packet processor operably coupled to the packet buffer for detecting lost packets.”). *Zhu* explains that the “packet processor (204) extracts the sequence number for each packet and determines whether or not packets have arrived in sequence. Sequence numbers are also used for packet loss detection. Once a **packet loss is detected**, the packet processor (204) informs the QoS manager which packet has been lost.” *Id.* at 4:60–65.

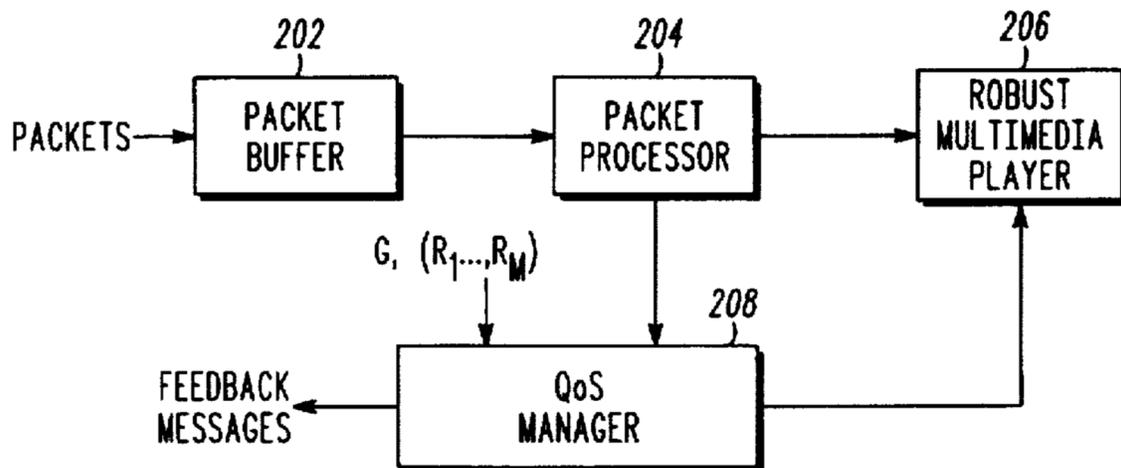


FIG. 2 200

Zhu (EX1008), Fig. 2

Thus, by describing the detection of a packet that is lost, *Zhu* discloses, or at least renders obvious, *deciding that a data packet is missing*. Houh (EX1003), ¶¶ 145–148.

[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;

Zhu discloses, or at least renders obvious, this limitation.

First, *Zhu* discloses *making a retransmission decision...as to whether a retransmission request for the missing data packet is to be sent*. As described above, *Zhu* describes that the packet processor “informs the QoS manager which packet has been lost.” *Zhu* (EX1008), 4:64–65. In turn, *Zhu* describes that “QoS manager (208) is operably coupled to the packet processor (204) for receiving the information on lost packets, and for sending control messages, i.e., feedback messages to the server. One kind of control message is a ‘retransmission request,’ which tells the server the identity of the lost packet and the number of copies requested for retransmission. A key aspect of the present invention is **the method the QoS manager determines whether or not to request a retransmission....**” *Id.* at 4:67–5:11; *see also* 6:33–38 (“determine how many copies of retransmission to request for the lost packet, or whether to send a retransmission request at all.”). By describing that the QoS manager “determines whether or not to request a retransmission”, *Zhu* discloses *making a retransmission decision...as to whether a retransmission request for the missing data packet is to be sent*. Houh (EX1003), ¶¶ 149–151.

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

Second, *Zhu* discloses *making a retransmission decision* that is based on *channel conditions*. The dependent claims of the '038 Patent specify that *channel conditions* include, among other considerations, available channel bandwidth. *Zhu* discloses that “the retransmission decision is made at the client based at least on **the predetermined bandwidth budget**.” *Zhu* (EX1008), 5:21–24; *see also* 6:41–44 (“number of copies of retransmission are chosen in such a way that the overall bitrate at the server does not exceed the predetermined **bandwidth budget G**.”); 12:54–56 (“number of copies requested generally further depends on a **bandwidth budget**”). The “bandwidth budget” in *Zhu* is the budget “on the packet network” (*see id.*, 4:24–28), which a POSITA would have understood as the *channel* between the client and server in *Zhu*. Houh (EX1003), ¶ 154. Thus, *Zhu*’s “bandwidth budget” corresponds to a channel bandwidth, and *Zhu* therefore discloses *making a retransmission decision, based on ... channel conditions*. Houh (EX1003), ¶¶ 153–155.

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

Third, *Zhu* discloses *making a retransmission decision* that is based on *importance of the missing data packet*. *Zhu* discloses “**retransmission decisions** may also be made based on **the importance of a lost packet**.” *Zhu* (EX1008), 5:25–

27; *see also* 5:11–13 (“[t]hese decisions may also depend on the **importance of the lost packet...**”); 6:33–47 (“QoS manager (208) uses the predetermined **importance of the lost packet...**to determine how many copies of retransmission to request for the lost packet, or whether to send a retransmission request at all.”). Thus, *Zhu* discloses *making a retransmission decision, based on ... importance of the missing data packet*. Houh (EX1003), ¶¶ 156–158.

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

Fourth, *Zhu* discloses, or at least renders obvious, *making a retransmission decision that is based on bit rates of previously received data packets*. *Zhu* discloses that the “**streaming rate and the number of copies of retransmission** are chosen in such a way that the **overall bitrate** at the server does not exceed the predetermined bandwidth budget G .” *Zhu* (EX1008), 6:42–44; *see also* 6:33–7:3. This calculation or evaluation is expressed as the following equation in *Zhu*:

$$R' + \sum_{1 \leq i \leq M} (\sum_{1 \leq j \leq L_i} p'_{ij}) R'_i \leq G, \quad (1)$$

Zhu (EX1008), 6:54; *see also* claim 7.

One of the variables in this equation is R'_i , which is defined as follows:

$$R'_i \leq R_i$$

Zhu (EX1008), 6:57.

Another variable in this equation is R' , which is defined as follows:

$$R' = \sum_{1 \leq i \leq M} R'_i$$

Zhu (EX1008), 6:60.

Zhu explains that the “original **data rates R'_i** ’s of the substreams are typically carried over from the server **to the client** at the start of the streaming session” but, because the variables in the equation above change, these data rates (i.e., these *bit rates*) must be updated: “Since p and L_i typically change with time, **R'_i ’s and C_{ij} ’s must be updated continuously** so that the above formula is satisfied” where “ p is the information loss rate in the packet network”, “ L_i is the number of retransmission attempts for substream i ” and “ $c_{ij} \geq 0$ represents the number of copies of a lost packet requested for retransmission.” *Zhu* (EX1008), 6:45–7:1. These rates are calculated “by the QoS manager” of the client and “fed back to the remote server.” *Id.* at 7:1–3.

In other words, *Zhu* describes the calculation of the data rate of the substream (R'_i), or the *bit rate*[i] of the substream, which a POSITA would have understood as

based on *previously received data packets*.⁷ Houh (EX1003), ¶ 164. *Zhu* further discloses that this calculation informs “the number of copies of retransmission” that are requested (*Zhu* (EX1008), 6:41–44) and thus teaches *making a retransmission decision, based on ... bit rates of previously received data packets* as recited. Houh (EX1003), ¶ 165.

In sum, *Zhu* discloses that the “retransmission decision is made at the client based at least on the predetermined bandwidth budget and the estimated information loss rate on the packet data network” (which includes a calculation of the data rates of the streams, which teaches the use of the *bit rates of previously received data packets*) as well as “the importance of a lost packet” to inform whether to request retransmission. *Zhu* (EX1008), 5:21–27, 6:33–7:3; Houh (EX1003), ¶¶ 159–165; *see also Zhu* (EX1008), claim 1 (“number of multiple copies requested depends on

⁷ Indeed, it would have been obvious to a POSITA that this calculation must be based on *previously received data packets* as the converse (calculating the data rate on future received data packets) is an impossibility. Houh (EX1003), ¶ 164. Further, a POSITA would have recognized that, because a data transfer rate is calculated as the rate at which data is moved between devices, it would be based on data that had already been transferred, i.e., *previously received data packets* as recited. Houh (EX1003), ¶ 164.

an importance of the lost packet”), claim 7 (“said number of copies for retransmission ... are sent based on the following relationship...where... R'_i is the streaming bit rate of substream i ;... G is the bandwidth budget at the server”). Accordingly, because *Zhu* describes considering the “bandwidth budget,” “importance of a lost packet,” and the “number of copies of a lost packet requested for retransmission” which is based on the data rates of previous packets, *Zhu* renders obvious *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* as recited. Houh (EX1003), ¶¶ 149–166.

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

Zhu discloses, or at least renders obvious, this limitation.

Zhu discloses that “[u]pon detecting a packet loss, the packet processor (304) signals the packet loss to the feedback message generator (314) and, if a retransmission is desired, the feedback message generator (314) **sends a retransmission request message** to the remote server.” *Zhu* (EX1008), 7:44–48; 5:4–6 (“One kind of control message is a ‘retransmission request,’ which tells the server the identity of the lost packet and the number of copies requested for retransmission.”); 13:21–36 (“client device comprising...a quality of service, QoS,

manager operably coupled to the packet processor for sending retransmission requests to the remote server...upon detection of a lost packet...”).

Thus, *Zhu* discloses *sending the retransmission request to the transmitter if the retransmission decision is affirmative*. Houh (EX1003), ¶¶ 167–171.

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

Zhu discloses, or at least renders obvious, this limitation.

As described above in the analysis of limitation [1.3], if the retransmission decision is affirmative, *Zhu* describes that the client device sends a retransmission request for the lost packet. *See Zhu* (EX1008), 7:44–48. *Zhu* discloses that “[f]or each retransmission request sent out, a timer is started in the retransmission manager (316). **If the retransmitted packet is received by the packet processor (304)** prior to the expiration of the corresponding timer, the timer will be cleared.” *Id.* at 7:55–59. Thus, *Zhu* discloses *receiving a packet retransmitted by the transmitter in response to the retransmission request*. Houh (EX1003), ¶¶ 173–174.

A POSITA would have also recognized that, in response to such a retransmission request, the “lost packet” would be *retransmitted by the transmitter* and the packet would be received. Houh (EX1003), ¶ 175. As described above in the Ground 1 analysis, 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 and logic and common sense indicate that this limitation would have been recognized by a POSITA given the disclosure of *Zhu*. Houh (EX1003), ¶ 175 (citing Comer (EX1018), p. 213)). Thus, *Zhu* teaches *receiving a packet retransmitted by the transmitter in response to the retransmission request*. Houh (EX1003), ¶¶ 172–176.

Accordingly, *Zhu* discloses, or at least renders obvious, all limitations of claim 1, and renders the claim obvious.

Claim 2

[2.1] The method according to claim 1, wherein the channel conditions include an available channel bandwidth.

Zhu discloses, or at least renders obvious, this limitation, as further detailed below. As detailed in the analysis of limitation [1.2], the decision in *Zhu* is based on “the predetermined bandwidth budget.” See *Zhu* (EX1008), 5:21–24. Thus, *Zhu* teaches that *the channel conditions include an available channel bandwidth* as recited. Houh (EX1003), ¶¶ 177–179.

Claim 3

[3.1] The method according to claim 1, wherein the channel conditions include a channel transmission delay.

Zhu discloses, or at least renders obvious, this limitation. *Zhu* discloses that

“[l]et T_r represent the **round trip delay** from the client to the server, then the remaining number N of retransmission attempts is given by: $N=(T_p-T_c)/T_r$ ” *Zhu* (EX1008), 5:59–63.

Thus, *Zhu* discloses *the channel conditions include a channel transmission delay* as recited. *Houh* (EX1003), ¶¶ 180–183.

Claim 4

[4.1] The method according to claim 1, wherein the channel conditions include a channel bit error rate.

Zhu discloses, or at least renders obvious, this limitation. As described above, one of the variables considered in *Zhu*'s retransmission decision is R' , and *Zhu* discloses that R' “may be determined from the information loss rate p on the packet network and the total end-to-end information loss rate q ...” *Zhu* (EX1008), 8:61–67. *Zhu* also explains that to “take advantage of the above method, it is necessary to estimate the information loss rate p on the packet network” which “can be accomplished in the client by measuring the total end-to-end information loss rate and the information loss rate p' on the low-speed access link.” *Id.* at 9:1–23. *Zhu* further explains that one “method to obtain p' is to obtain the information from the transmission device, such as a modem...modems have the ability to measure **bit error rate through a variety of schemes**...this gives a direct indication of p' .” *Id.*

at 9:1–29. Thus, *Zhu* discloses *the channel conditions include a channel bit error rate* as recited. Houh (EX1003), ¶¶ 184–188.

D. Ground 4: *Zhu* in view of *Radha* renders obvious claim 5

1. Overview of *Radha*

Radha, which is in the same field as the '038 Patent of transmitting video data and retransmitting missing data packets, describes “a decoder buffer for use in a streaming video receiver.” *Radha* (EX1013), 2:25–34; 1:16–18. In pertinent part, *Radha* describes that a buffer in the video receiver includes capability for “detecting lost packet(s) and transmitting associated negative acknowledge (NACK) messages to the transmitter.” *Id.* at 7:33–40.

2. Analysis

Claim 5

[5.1] The method according to claim 1, wherein the retransmission request is a NACK (non-acknowledgment) packet.

As noted above, *Radha* teaches that, if a packet is detected as lost, the receiver transmits “associated negative acknowledge (NACK) messages to the transmitter.” *Radha* (EX1013), 7:33–40. Thus, *Radha* teaches *the retransmission request is a NACK (non-acknowledgment) packet*. Houh (EX1003), ¶ 194.

A POSITA would have been motivated to combine this teaching of *Radha*

because doing so would have been no more than the use or application of a known technique to a known method. *Zhu* discloses retransmission requests, describes “packet data networks”, and acknowledges that the retransmission requests are sent by the QoS manager in concert with the packet processor. *See, e.g., Zhu* (EX1008), 4:64–5:20. *Zhu* also discloses that “positive acknowledgment messages” were known. *Id.* at 1:34–38. *Radha* provides teachings of the converse—a negative acknowledgment message or type of packet that could be used for the retransmission request of *Zhu*—i.e., the NACK message. A POSITA would have found it obvious to apply this teaching of *Radha* in *Zhu*’s methods, as doing so would have been no more than characterizing the type of request message described in *Zhu*, which would have been recognized as common at the time of the ’038 Patent. Houh (EX1003), ¶¶ 195–197. For example, a POSITA would have recognized that NACK packets were known at the time of the ’038 Patent, based on the POSITA’s knowledge of standards-related documents. *See, e.g.* RFC 2357 (EX1016), p. 4. Thus, a POSITA would have been motivated to incorporate *Radha*’s teachings of a NACK message, and in combination with *Zhu*, renders obvious claim 5. Houh (EX1003), ¶¶ 193–197.

VII. THE BOARD SHOULD NOT EXERCISE ITS DISCRETION TO DENY THE PETITION

Petitioner respectfully submits that the Board should not exercise its

discretion under 35 U.S.C. §§ 325(d) or 314(a) to deny this Petition.

**A. The Board Should Not Exercise Discretion to Deny Under §325(d)
Based on the Prior Art Previously Cited**

Although *Ravi* is related to a reference cited during prosecution, and *Zhu* was applied by the examiner during prosecution, the Board should not exercise its discretion under § 325(d), because the Office materially erred in allowing the claims over these references.

Ground #1 (*Ravi* and *Goetz*): *Ravi* is related to and has substantially the same disclosure as U.S. Patent 5,918,002 to Klemets et al., which appears on the face of the '038 Patent. See '038 Patent (EX1001), field (56). Thus, it may be argued that *Ravi* is cumulative to Klemets. However, mere citation of a reference “does not weigh in favor of exercising the Board’s discretion under § 325(d) to deny a petition. *Weber, Inc. v. Provisur Techs., Inc.*, IPR2019-01467, Paper 7 at 10 (PTAB Feb. 14, 2020). Here, any argument regarding § 325(d) is even further removed, since *Ravi* itself was never cited during prosecution. Nevertheless, the Board should not exercise its discretion to deny the Petition because the combination presented herein (*Ravi* in view of *Goetz*) has never previously been considered.

Further, even to the extent Klemets or portions of *Ravi*’s disclosures were considered, the examiner erred in not rejecting the claims over the disclosure of Klemets, and therefore Ground #1 should not be denied under § 325(d). *Ravi* (and Klemets) teach exactly what the applicant argued as allegedly not disclosed in the

reference applied in the sole Office Action: a retransmission decision based on *bit rates of previously received data packets*. Additionally, *Goetz*, which was not before the examiner during prosecution, provides teachings of this limitation as well.

As set forth in the Board’s precedential *Advanced Bionics* decision, an “example of a material error may include...overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims.” *Advanced Bionics, LLC v. Med-El Elektromedizinische Gerate GmbH*, IPR2019-01469, Paper 6 at 8 n. 9 (PTAB Feb. 13, 2020) (precedential). That is precisely the case here with respect to Ground #1: the Office “erred in a manner material to the patentability of [the] challenged claims” and on this point, Petitioner respectfully submits that “reasonable minds” cannot “disagree regarding the purported treatment of the art or arguments. *Id.* at 8–9. Rather, it is apparent that “the Examiner erred in the evaluation of the prior art” because “the Examiner misapprehended or overlooked specific teachings in the relevant prior art such that the error by the Office was material to the patentability of the challenged claims.” *Id.* at 21; *see also* at 10 (when “the record of the Office’s previous consideration of the art is not well developed or silent, then a petitioner may show the Office erred by overlooking something persuasive...”). Here, the examiner misapprehended or overlooked specific teachings in the relevant prior art that taught the sole limitation, *bit rates of previously received data packets* (*see* limitation [1.2.4], *supra*), that the

applicant argued distinguished the claims over the only applied reference. The record is silent on consideration of *Ravi* or Klemets on this point. Thus, because Office erred when considering the prior art during prosecution by not applying *Ravi* (or Klemets), exercising discretion under § 325(d) is not warranted for Ground #1.⁸

Ground #3 (Zhu): *Zhu* was applied by the examiner to reject then-pending claims 13–18 ('038 PH (EX1002), pp. 39–40), which subsequently issued as claims 1–5 after the applicant amended prosecution claim 13 to include the limitation of prosecution claim 17. But the examiner erred in not continuing to reject the claims over *Zhu*.

Notably, the examiner cited four passages of *Zhu* in support of the finding that *Zhu* “clearly anticipated” the claims: (1) 4:56–65; (2) 5:21–27; (3) 7:46–51; and (4)

⁸ For completeness, Petitioner notes that the '038 Patent acknowledges that Klemets discloses a “similar method for selectively retransmitting missing data packets of a data stream” and it alleges that the “mentioned prior art...leads to [] disadvantages when transmitting video data through an unreliable channel.” '038 Patent (EX1001), 2:63–3:17. However, the challenged claims do not require transmission “through an unreliable channel” and this alleged distinction is not relevant to the analysis set forth in Ground #1 above, which shows that *Ravi* discloses much of the recited subject matter.

5:48–6:14. *See* '038 PH (EX1002), pp. 39–40. In traversing the anticipation rejection over *Zhu*, the applicant cited the fourth passage, at 5:48–6:14 (*see* '038 PH (EX1002), p. 32), but did not specifically address any other disclosure of *Zhu*. But, as detailed above, and as supported by the testimony of Dr. Houh, *Zhu* indeed discloses, or at least renders obvious, making a retransmission decision based on *bit rates of previously received data packets* in the passage from column 6, line 33 to column 7, line 3—**disclosure that neither the examiner nor the applicant cited.** *See Zhu* (EX1008), 6:33–7:3; '038 PH (EX1002), p. 32. Thus, this is another “example of a material error” resulting from “overlooking specific teachings of the relevant prior art where those teachings impact patentability of the challenged claims.” *Adv. Bionics*. at 8 n. 9; *see also Weatherford U.S., L.P. v. Eventure Global Tech., Inc.*, IPR2020-01684, Paper 16 at 19 (PTAB Apr. 14, 2021) (granting institution over § 325(d) arguments where asserted prior art references disclosed claim amendments made to overcome rejections in prosecution); *Commscope Techs. LLC v. Dali Wireless Inc.*, IPR2020-01473, Paper 18 at 16 (PTAB Mar. 12, 2021) (granting institution over § 325(d) arguments and finding examiner error where asserted prior art references disclosed features cited in examiner’s reasons for allowance); *Arrows Up, LLC v. Oren Techs.*, IPR2018-01231, Paper 7 at 11–12 (PTAB Jan. 14, 2019) (granting institution over § 325(d) arguments and finding examiner error where petitioner asserted that examiner had misunderstood reference

as not teaching allowable feature and expert declaration provided testimony in support). Had the examiner reviewed the remainder of *Zhu*, and had the examiner considered a POSITA's testimony regarding an understanding of *Zhu* (as provided here by Dr. Houh), the claims would have been rejected again as at least obvious over *Zhu*, as presented above. Thus, exercising discretion under § 325(d) is not warranted for Ground #3.

B. The Board Should Not Exercise Discretion to Deny Under §314(d) Because there are No Prior Petitions

The '038 Patent has not been challenged in any prior IPR petition. As such, none of discretionary institution factors 1–5 set forth in *General Plastic* apply to this Petition. *See General Plastic Indus. Co., Ltd. v. Canon Kabushiki Kaisha*, IPR2016-01357, Paper 19 at 16 (PTAB Sept. 6, 2016) (Section II.B.4.i. precedential).

C. The Board Should Not Exercise Discretion to Deny Under *Fintiv*

Patent Owner has asserted the '038 Patent in two litigations, as noted above in § I.B; only one (against TCL Technology Group and associated entities, collectively “TCL”) is active. That litigation (the “TCL Case”) was filed January 13, 2021. *See* EX1011, p. 40. Petitioner is not a defendant, real party-in-interest, or privy of TCL, and Petitioner is not involved in that case.⁹ *See* Jakel Declaration

⁹ For avoidance of doubt, Petitioner is not a defendant, real party-in-interest, or privy of LG Electronics or any LG entity, the defendants of the terminated case.

(EX1015). Petitioner has not communicated with TCL regarding this Petition, the TCL Case, or the '038 Patent.

In *Apple Inc. v. Fintiv, Inc.*, the Board set forth six factors guiding discretion under § 314(a) by considering efficiency, fairness, and the merits in view of an earlier trial date. IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential). These factors favor institution.

As to *Fintiv* factor 1, the complaint in the TCL Case was recently filed; as of the filing of this Petition, TCL has not filed its answer, and it is not due until at least May 19, 2021. *See* EX1021. According to public information, there is no indication in the TCL Case whether the district court will grant or deny a stay motion if this proceeding is instituted. TCL did not know of this Petition before it was filed. Jakel Decl. (EX1015). Petitioner is not in communication with TCL and is not aware of its plans regarding a stay. Thus, this factor is speculative at best, neither weighing for nor against discretionary denial.

Fintiv factor 2 favors institution. The Board would issue a final written decision in this proceeding by approximately September 2022. The TCL Case is not at an advanced stage; indeed, there is no schedule set for the TCL Case and an answer is not due until May 2021. *See* Docket Sheet (EX1012); Order (EX1014). Therefore, it is likely the Board will likely issue a final written decision before the TCL Case proceeds to trial, even if a trial date were set. *Cf. In re Apple Inc.*, 979

F.3d 1332, 1344 n.5 (Fed. Cir. 2020) (anticipating district court trial dates “frequently calls for speculation” because “scheduled trial dates are often subject to change”). The interests of efficiency, fairness, and patent quality favor institution, even if the district court trial is accelerated to occur before the Board would issue a final written decision. Thus, *Fintiv* factor 2 weighs against discretionary denial.

Fintiv factor 3 favors institution. It is unclear whether Patent Owner, TCL, and the district court will have made some investment in the TCL Case by the Board’s institution decision, given that no answer has been filed and no schedule is of record. Thus, most of the investment and effort in the TCL Case will occur *after* the Board’s institution decision.

Fintiv factor 4 also favors institution. There is minimal overlap because the Petition challenges claims 1–5. According to public records, only claim 1 is at issue in the Pending TCL Case. *See* EX1011, p. 36. Further, Petitioner is not a party to the TCL Case, or in communication with TCL, and therefore has no knowledge about any potential overlap between the grounds in this Petition and what TCL may include in its invalidity contentions.¹⁰ Should Patent Owner argue in favor of discretionary denial based on any overlap between the asserted grounds and TCL’s

¹⁰ According to the most recent filing, TCL’s deadline to serve preliminary invalidity contentions is June 30, 2021. *See* EX1014, p. 2.

invalidity contentions, Patent Owner should make TCL's invalidity contentions of record to allow Petitioner and the Board to evaluate the degree of overlap.

Fintiv factor 5 weighs heavily against discretionary denial. Petitioner is not a defendant in the TCL Case, and is not a real party-in-interest, or in privity with TCL.

Finally, *Fintiv* factor 6 strongly weighs against discretionary denial. The merits of the Petition are extremely strong. *Fintiv*, Paper 11 at 14–15 (“[I]f the merits of a ground raised in the petition seem particularly strong on the preliminary record, this fact has favored institution.”). The Petition demonstrates that the prior art discloses the very limitations that the examiner found to be allowable over the art considered during prosecution.

Thus, the *Fintiv* factors weigh heavily against discretionary denial.

D. Discretionary Factors Summary

As detailed above, none of the discretionary bases under either §§ 325(d) or 314(a) support denial of the instant Petition.

VIII. CONCLUSION

For the reasons above, Petitioner asks that the Patent Office order an *inter partes* review trial for claims 1–5 and then cancel these claims as unpatentable.

Respectfully submitted,

May 3, 2021

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IX. CERTIFICATE OF WORD COUNT

Pursuant to 37 C.F.R. § 42.24, the undersigned attorney for the Petitioner, Unified Patents, LLC, declares that the argument section of this Petition (Sections II-VIII) has 11,763 words, according to the word count tool in Microsoft Word™.

/Raghav Bajaj/
Raghav Bajaj
Counsel for Petitioner
Registration No. 66,630

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Unified Patents, LLC § Petition for *Inter Partes* Review
Petitioner §
 § U.S. Patent 6,877,038
 §
 §

CERTIFICATE OF SERVICE

The undersigned certifies, in accordance with 37 C.F.R. §§ 42.105 and 42.6, that service was made on the Patent Owner as detailed below.

Date of service May 3, 2021

Manner of service FEDERAL EXPRESS

Documents served Petition for *Inter Partes* Review, including Exhibit List;
Exhibits 1001 through 1021

Persons served Ascenda Law Group, PC
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