

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PELOTON INTERACTIVE, INC.,
Petitioner,

v.

NEC CORPORATION,
Patent Owner.

Case No. IPR2023-01239
Patent No. 8,752,101

PATENT OWNER'S SUR-REPLY

LIST OF EXHIBITS	
Exhibit	Description
2001	Declaration of Daniel Schonfeld, dated December 5, 2023
2002	Curriculum Vitae of Dr. Daniel Schonfeld
2003	Peloton’s Disclosure of Terms and Constructions
2004	H. Schulzrinne et al., RTP: A Transport Protocol for Real-Time Applications, RFC 3550, July 2003
2005	D. Schonfeld, “Video Communication Networks,” (Invited Chapter), <i>Handbook of Image and Video Processing. Second Edition.</i> A. Bovik (ed.), Academic Press: San Diego, California, Chapter 9.3, pp. 1031-1064, 2005
2006	H.323: Packet-based multimedia communications systems, Nov. 1996
2007	Kurose, James F., and Keith W. Ross, <i>Computer Networking: A Top-down Approach.</i> 2017.
2008	Tanenbaum, Andrew S., and David Wetherall, <i>Computer Networks.</i> Prentice Hall, 2011
2009	H. Schulzrinne et al., Real-Time Streaming Protocol (RTSP), RFC 2326, 1998.
2010	S. Akhshabi et al., “An Experimental Evaluation of Rate-Adaption Algorithms in Adaptive Streaming over HTTP,” <i>Proc. 2011 ACM Multimedia Systems Conf.</i>
2011	U.S. Patent No. 6,370,688 (Hejna)
2012	Declaration of Dr. Jeremy Cooperstock, dated May 31, 2024
2013	Declaration of Dr. Kevin C. Almeroth Regarding Claim Construction
2014	Joint Claim Construction Brief Filed in Related Delaware District Court Case (JCC)
2015	Deposition Transcript of Clifford Reader, PH. D.
2016 (New)	Supplemental Declaration of Dr. Jeremy Cooperstock, dated October 4, 2024

TABLE OF CONTENTS

I.	Introduction.....	1
II.	Claim Construction.....	1
	A. “Determining the code rate based on...” means that the “available time” and “remaining time” must be used as an input.....	1
	B. PO Does Not Add Limitations to the Claims.....	3
III.	Chou does not disclose limitation 1[d].....	6
	A. Chou does not disclose “determining the code rate based on ... an available reproduction time.”	6
	1. Petitioner is unable to identify an “available time” that is used as an input to “determining the code rate” for content data to be transmitted	7
	2. Petitioner’s new theory that “g(n-1)” teaches a “client buffer duration” is untimely and fails on the merits.	11
	3. Petitioner’s rebuke of Chou’s “target buffer duration”	18
	4. Chou’s “one frame delay”	19
	B. Chou does not disclose “determining the code rate based on a remaining time.”	20
	1. Chou does not disclose a “remaining time” or that the “code rate is determined based on” the “remaining time”	21
	C. Petitioner’s other arguments.....	22
IV.	Chou And Wang do not disclose limitation 1[d].....	23
V.	Conclusion	24

TABLE OF AUTHORITIES

Page(s)

CASES

<i>Delta, LLC v. Cisco Sys.</i> , 942 F.3d 1352 (Fed. Cir. 2019)	16, 18
<i>Koninklijke Philips N.V. v. Zoll Lifecor Corp.</i> , No. 2:12-CV-1369, 2014 WL 5088863 (W.D. Pa. July 31, 2014).....	3
<i>Masimo Corp. v. Sotera Wireless, Inc.</i> , No. 2022-1415, 2023 WL 6307959 (Fed. Cir. Sept. 28, 2023).....	3
<i>SAS Institute Inc. v. Iancu</i> , 584 U.S. 357 (2018).....	7

STATUTES

35 U.S.C. § 312(a)(3).....	7
----------------------------	---

OTHER AUTHORITIES

37 C.F.R. § 42.6(e).....	26
37 C.F.R. § 42.24(a).....	25
37 C.F.R. § 42.24(b)	25
37 C.F.R. § 42.24(d)	25
37 C.F.R. § 42.105(a).....	26
37 C.F.R. § 42.22(a)(2)	7

I. INTRODUCTION

Petitioner's Reply fails to address the clear errors and failures within the Petition identified in the Patent Owner Response—namely, none of the grounds disclose at least limitation 1[d]: determining the bit rate based on a “remaining time” and an “available reproduction time” (herein “available time”). Instead, Petitioner seeks to improperly supplement the Petition and expert declaration with new theories and arguments that cannot be reconciled with Petitioner's previous positions. Petitioner's new arguments confirm what Dr. Reader has already admitted: he used (and is using) the claims as a “roadmap” by finding discrete elements in Chou along with his knowledge as an expert to create a theory of obviousness. Petitioner's inability to point to an “available time” and “remaining time” in Chou to meet the limitations of element 1[d] are fatal to its position. For these reasons, as explained in further detail below, the Board should reject each of Petitioner's arguments.

II. CLAIM CONSTRUCTION

A. **“Determining the code rate based on...” means that the “available time” and “remaining time” must be used as an input**

Petitioner mischaracterizes PO's explanation of how a POSITA would understand the claims under a plain and ordinary construction. The plain and ordinary meaning of “based on,” in the context of these claims, would be interpreted by a POSITA to mean that two *time* variables (*i.e.*, “remaining time” and “available time”) – the details of which are defined by the claims themselves – are used as

inputs to the determination of the code rate in Claim [1d]. EX2012, ¶¶57, 60, 63, 83. This interpretation is supported not only by the claim language itself, but also the specification and the extrinsic evidence, including the testimony of Dr. Cooperstock. EX2012, §V.A.1. The specification provides an equation where two time variables are used as inputs, which the specification summarizes as follows: “[t]hat is to say ... the code rate [is] determined *based on* the available reproduction time.” *Id.* (citing EX1001, 10:65-11:3. As Dr. Cooperstock explains, a POSITA would understand that the ’101 Patent is signifying here that the “available time” is used to determine the code rate of future content data. *Id.* Peloton takes Dr. Cooperstock’s testimony out of context and adds in the word “directly” to the other statements, whereby PO explains that a POSITA would understand “based on” to mean “used as an input.” Reply, 3 (“values that need to be [directly] used as an input to the determination process”) (citing POR 1-2).

Peloton’s arguments fail because the plain and ordinary meaning of the claims requires the “available time” and “remaining time,” (themselves as defined by the claim), to be used as an input—either directly in the final determination step or indirectly in steps leading up to the final determination of the code rate. EX2012, ¶¶57, 60, 63, 83. But, as explained below, Chou does not disclose using the “available time” or “remaining time” as inputs indirectly or directly throughout its process of determining the code rate.

B. PO Does Not Add Limitations to the Claims

Contrary to Peloton’s allegations, neither PO nor Dr. Cooperstock have added limitations from the specification into the claims. Instead, PO is merely insisting that the plain language of the claims requires the time variables, as described, be used as an input in the process of determining the code rate. Chou does not.

PO’s position is consistent with the cases cited by Peloton. For example, in *Masimo Corp. v. Sotera Wireless, Inc.*, No. 2022-1415, 2023 WL 6307959 (Fed. Cir. Sept. 28, 2023), the Federal Circuit affirmed the Board’s understanding of “based on,” in the context of those claims, meant that the alarm condition must first be present for the alarm to be “based on” the condition. *See also id.*, *3 n.1 (“[t]he Board cited to a dictionary definition of ‘base on’ ... noting it defines ‘the verb ‘base on’ to mean ‘to use particular ... facts to make a decision [or] do a calculation.’”).¹

¹ In *Koninklijke Philips N.V. v. Zoll Lifecor Corp.*, No. 2:12-CV-1369, 2014 WL 5088863, at *18 (W.D. Pa. July 31, 2014), R&R adopted 2014 WL 4792609 (W.D. Pa. Sept. 24, 2014), the Court adopted a plain meaning and rejected “as a direct and immediate consequence” because the specification, nor the prosecution history suggested such a limited meaning. *Id.* at *18. In contrast, here, the ’101 Patent (and the plain meaning of “based on”) does support the plain and ordinary meaning of “as an input.” EX2012, §V.A.1

This opinion supports Patent Owner’s explanation of how a POSITA would understand “based on” in the context of the claims here because the “remaining time” and “available time” must first be present in order for the code rate to possibly be determined based on it. Neither Petitioner nor Dr. Reader’s supplemental declaration provide any reasons that contradict PO’s explanation of the plain and ordinary meaning of this term beyond an unsupported statement that Dr. Reader “disagree[s]” with Dr. Cooperstock. EX1040, ¶¶2-4.

Petitioner’s position (*i.e.*, that “based on” merely means that a “factor” has some “impact or influence” on the “event”), Reply, 4, is without merit. For the “factor[s]” (*i.e.*, the available time or the remaining time) to have some “impact or influence” on the “event” (*i.e.*, determining the code rate), the “factors” must be used as inputs in the process of determining the code rate.

Moreover, even adopting Petitioner’s apparent claim construction position, Chou fails to disclose limitation 1[d] because Chou never discloses that the “factor[s]” (*i.e.*, the available time or the remaining time) are used to “impact or influence” the determination of the code rate, as evidenced by Chou’s failure to disclose that the factors are ever determined (much less used) for the determination of the code rate. *See* EX2012, §§ V.B.2-4.

Petitioner's arguments regarding claims 2 and 3 mischaracterize PO's arguments and also fail. Petitioner appears to rely on claim differentiation to argue that claim 2's reciting of "determining a value" implies that "available time" in claim 1 need not have a value. Reply, 5. But Claim 2 is not merely limiting the "available time" of claim 1 to having a value. Instead, Claim 2 recites that the "value" is the "the code rate" and simply confirms that the "available time" of claim 1 is a value that is compared to a value of the "target available time." EX1001, Cl. 2. Similarly, Petitioner's reliance on the word "acquire" in claim 3, which recites in context "acquire a communication speed," does not contradict Dr. Cooperstock's position; instead, the remaining limitations confirm that the available time in claim 1 is indeed a value based on the stored content data. EX1001, Cl. 3. Petitioner's arguments attempting to differentiate claims 2 and 3 from claim 1 demonstrate that Chou does not disclose the elements of dependent claims 2 and 3.

Although PO does not believe that these claims need express construction because the plain and ordinary meaning of "based on" in the context of the claims, as understood by a POSITA, is clear, should the Board find that one is needed given Petitioner's dispute, it should construe "based on" to mean "using, as an input" consistent with the intrinsic record and the customary meaning of that term, as supported by extrinsic evidence, including Dr. Cooperstock's declaration.

III. CHOU DOES NOT DISCLOSE LIMITATION 1[D]

Petitioner fails to show that Chou discloses limitation 1[d] because Petitioner cannot point to an “available time” and “remaining time” in Chou that are used to determine a code rate.

A. Chou does not disclose “determining the code rate based on ... an available reproduction time.”

The Petition identifies the "client buffer duration," represented by the “gap” between a “playback deadline of a frame and its arrival time ($t_d(n)-t_a(n)$),” as satisfying the “available time” limitation. Pet, 39-40. The problem with this theory, as pointed out in the POR, is that *Chou* never discloses or suggests calculating this “gap,” much less using that calculated value as a basis to determine the code rate. POR, §VI.B.2; EX2012, §V.B.3. This problem was exacerbated during Dr. Reader’s cross-examination, where when confronted with the fact that this “gap” was not used to determine the code rate in Chou (*see* EX2015, 99:4-12), he changed theories, attempting to introduce a new mapping to the claims on the fly. *Id.*, 99:18-102:12, 142:24-143:2; 153:23-154:15 (Dr. Reader stating that the available time is met by (1) $t_b(n)-t_a(n)$; (2) $t_d(n)-t_b(n)$; and (3) the target buffer duration ($t_d(n)-t_T(n)$)). These new theories were just as meritless, and Peloton does not attempt to rely on them in its Reply.

Instead, Peloton’s Reply pivots, and offers a yet another new theory regarding how *Chou* discloses the “available time” limitation. Reply, §III.A.3, 25. Peloton now

argues that the variable $g(n)$ represents the client buffer duration. *Id.*, 14-15, 25. This new theory is untimely and improper, as it (and the declaration evidence of Dr. Reader cited in support) should have been cited in the Petition. *SAS Institute Inc. v. Iancu*, 584 U.S. 357 (2018) (“The statute envisions an inter partes review guided by the initial petition.”); 35 U.S.C. § 312(a)(3); 37 CFR §§ 42.22(a)(2); 42.104(b)(4-5); 42.23(b); Consolidated Trial Practice Guide at 73 (Nov. 2019).

This new theory further demonstrates that Dr. Reader’s testimony is not credible and confirms that he is (and has been) relying on impermissible hindsight, using the claims as a “roadmap” to develop his invalidity theories. EX2015, 76:4-9. Even under its new theory, Dr. Reader still fills gaps with conclusory testimony of what a POSITA “would” have been able to modify, with no rationale underpinning or motivation, apart from hindsight. EX1040, ¶13 (“a POSITA would be able to...”), Reply, 14-15 (same), (“a POSITA would have been able to easily modify Equations 18 and 19”); Reply, 15 (same).

Nevertheless, Peloton’s new theory regarding $g(n)$ fails on the merits, as explained below.

1. Petitioner is unable to identify an “available time” that is used as an input to “determining the code rate” for content data to be transmitted

Peloton argues that “Chou’s client buffer duration – which corresponds to ‘the gap between the frame’s arrival time and its playback deadline’ – is Available

Time.” Reply, 6-7; *cf.* Reply, 14 (“gap $g(n-1)$, which represents the size of the decoder when frame (n) arrives or the client buffer duration at that time.”), 25 (“Chou’s calculation of $g(n)$ (i.e., the client buffer duration).”). However, Petitioner fails to address the arguments made in the POR. *See* POR, § VI.B.2.

Petitioner’s argument that the “gap between the frame’s arrival time and its playback deadline” is used as an input to determine the code rate for future content data to be transmitted, fails. Reply, §III.A.1. Petitioner relies on paragraph 19 of Chou, but mischaracterizes it. *Id.*, 7-9. That paragraph starts by explaining generally how coding bit rate control works. EX1004, ¶19 (“**[i]n general**, this coding bit rate control involves dynamically adjusting the coding bit rate of the streaming media data to control the client buffer duration.”). Chou continues by explaining the purpose is to keep the buffer from “underflowing” while maximizing the code rate of the data. *Id.* However, the second-to-last sentence in this same paragraph plainly explains that Chou’s system does **not** control the actual client buffer fullness. Chou states, in contrast to the general techniques in the prior sentences: “[i]t is noted that **in the present system and process, it is not the actual fullness of the client buffer** that is controlled, but an upper bound on the time of arrival of bits into the client buffer, **to a target level.**” *Id.* This sentence of Chou defines the purported invention: achieving buffer stability by **not** controlling the buffer fullness to a target level. EX1041 (Cooperstock Dep. Tr.), 167:3-168:12.

Importantly, the above statement in paragraph 19 of Chou that starts “[i]n general” is the **only** evidence Petitioner relies on for the proposition that Chou discloses using the “client buffer duration” in the determination of the code rate for future frames, even though Chou expressly states it is not doing so. Reply, 7-8. Petitioner alleges that “[i]ntuitively, Chou’s disclosures that it examines buffer duration make sense. To maintain a target buffer duration, Chou has to consider the current buffer size in order to increase or decrease the coding rate to achieve the target duration.” *Id.* But, since Chou discloses that it is **not controlling the buffer duration to a target time** in that paragraph, but instead controlling an **encoder parameter to a target level**, the past values of the buffer duration are not used in “dynamically controlling the bit rate.” EX1041, 167:3-168:12; *see also* EX1004, ¶25 (“The client employs the **encoder** buffer parameters and the upper bound gap values to determine on a frame-by-frame basis the coding bit rate.”)

Petitioner criticizes Dr. Cooperstock for not providing opinions about Chou’s feedback loop. Reply, 8. Petitioner fails to acknowledge, however, that the Petition itself does not mention a feedback loop with respect to Claim 1[d]; the only appearance of “feedback” (not “feedback loop”) in the Petition or Dr. Reader’s original declaration appears with respect to Claim 1[e]. EX1041, 168:13-169:14. Moreover, as explained below, Chou discloses that $g(n-1)$ (or $g(n)$) is **only** determined for the encoder buffer and transmitted **by the server** to the client, thus

$g(n-1)$ does not (and cannot) have any information regarding the “content data stored in the storage device” of the client, as claimed. EX2016, ¶¶8-11. Chou itself confirms that the “encoder buffer parameters and upper bound gap $[g(n)]$ ” are what are used to “determine the code rate,” which confirms that Chou does not disclose limitation 1[d]. *Id.*, ¶11. EX1004, ¶25.

Petitioner also argues Chou’s disclosure that “it is not the actual client buffer” that is controlled does not “teach away” from using the actual client buffer. Reply 9. Petitioner argues that Chou’s disclosure “does not mean that the buffer fullness is **not affected** by controlling the upper bound to the target.” *Id.* But this is incorrect as the claims require the “available time” as time for reproducing content that is based on (or determined using, as an input) the content data stored **in the storage device**, as explained herein. EX1001, Cl. 1; EX2012, ¶¶56-57. Since Chou’s disclosed methods of determining code rate are independent of content data stored, Chou not only fails to disclose the claims, but teaches away from the claims because Chou teaches operating independent of the contents of the client buffer and instead focused on encoder side parameters. EX1004, ¶25; EX2012, ¶¶75, 85, 118; EX1041, 168:8-12. In addition, Petitioner ignores the multiple other reasons Chou teaches away from using prior buffer durations. *See, e.g.*, POR, §VI.B.4 (“considering the actual fullness (i.e., actual arrival times of packets) ‘would result in very poor quality overall’”) (citing EX1004, ¶70); EX2012 §V.B.5. Regardless, at the very least,

Petitioner would require changing the principle of operation of Chou, which is strong evidence that its proposed modification lacks proper motivation and is unobvious.

Finally, the claims require the “available time” to be a time for reproducing the content that is **stored** in the storage unit as an input to determining the code rate of “content data **to be** transmitted.” EX1012, ¶¶56-57, 65; EX1001, Cl. 1. Merely affecting a **future** buffer duration is insufficient and Chou does not disclose that the alleged current or past buffer duration, which do not correspond to the claimed available time (POR, §VI.B.2.b; EX2012, §V.B.3.4), are used as an input to determining the code rate. POR, §VI.B.2.c; EX2012, §V.B.3.c.

2. Petitioner’s new theory that “g(n-1)” teaches a “client buffer duration” is untimely and fails on the merits.

a) Petitioner’s new theory regarding “g(n-1)” is untimely and should be ignored.

In the Petition, Petitioner relies on the “client buffer duration,” defined by the gap between a “playback deadline of a frame and its arrival time ($t_d(n)-t_a(n)$),” as satisfying the “available time” limitation, as meeting the “available time” limitation. Pet, 39-40; *see also* EX1006, ¶153. Nowhere does the Petition reference or rely on Equation (18) (or any equation), the variables “g(n)” or “g(n-1),” or Figure 4 of Chou

(which the Reply relies on).² Dr. Reader was also questioned extensively on his opinions regarding the portions of Chou that met this, and although flip-flopped, he identified three “gaps” that, in his opinion, might satisfy the “available time” limitation. But none of those “gaps” include the variable Peloton relies upon now ($g(n)$ or $g(n-1)$). Dr. Reader was afforded every opportunity to identify that variable during his deposition but did not do so. EX2015, 151:17-154:15 (“Let me make it even more simple. Can you point to a value in Chou that you believe *is* the available reproduction time in claim 1 ...”); *see also id.* 99:18-102:12, 142:24-143:2; 153:23-154:15.

For the first time in its Reply,³ Petitioner states, “[a]ccordingly, Chou determines code rate $r_c(n)$ for frame (n) **based on gap $g(n-1)$** , which represents the size of the decoder when frame (n) arrives or **the client buffer duration** at that time.”

² Petitioner criticizes Dr. Cooperstock for allegedly “not consider[ing] Chou’s broader disclosures,” but such theories are not advanced by the Petition. EX1041, 168:13-169:14 (explaining Figure 4 of Chou, “ $g(n)$,” and Chou’s feedback loop do not appear in the Petition as allegedly disclosing this limitation.).

³ Petitioner states that this issue is moot because of its claim construction arguments. Reply, 11. However, as explained above in §II., even under Petitioner’s interpretation of the claims, Chou fails to disclose this limitation.

Reply, 14. That is, Petitioner is alleging for the first time that the “gap $g(n-1)$ ” in bits is the “client buffer duration” (it is not) instead of the gap identified in the Petition. *Id.*; *see also* Reply 25 (“Chou’s calculation of $g(n)$ (*i.e.*, the client buffer duration)”). Accordingly, Petitioner’s new arguments in Section III.A.3 of the Reply, and the corresponding portions of Dr. Readers supplemental declaration, should be ignored by the Board as improper new arguments.

b) Petitioner’s new theory fails on the merits

Petitioner’s new theory regarding the gap $g(n-1)$ relies on three flawed premises. Petitioner argues: (1) that the gaps $g(n-1)$ and $g(n)$ “denotes number of bits in the decoder (client) buffer” for frames $(n-1)$ and (n) respectively (Reply, 11-14); (2) although the gaps “ $g(n)$ and $g(n-1)$ are denoted in in bits” the “decoder buffer size can readily be converted to the corresponding buffer duration” (*Id.*, 14), and (3) that “a POSITA would have understood that when Equation (18) accounts for the ‘playback deadline’ and the ‘target schedule’ of Figure 5, it would factor in the client buffer size according to this model” (*Id.*, 15-16). As explained below, each of these arguments are flawed. EX2016, ¶¶5-7.

First, the gaps $g(n-1)$ and $g(n)$ ⁴ do not denote the number of bits in the decoder (client) buffer, but instead is a parameter of **the encoder buffer** and **not a**

⁴ PO refers to “gap $g(n-1)$ ” herein, but PO’s analysis applies to “ $g(n)$ ” as well.

parameter of the decoder (client) buffer. EX2016, ¶8 (citing EX1004, ¶¶69 (“Using Eq. (16), the **client can compute $t_b(n-1)$ from ... $g(n-1)$** (which can be transmitted to the client along with the data in frame $n-1$ or computed at the client as described in Section V-E).”); 113 (“Whenever a new coding bit rate starts, the **client receives the value $g(n)$ along with the new frame.**”). That is, $g(n-1)$ is an “encoder side upper bound gap” that must be transmitted to or inferred by the client after receiving an initial value of $g(n)$ for a given code rate from the server. *Id.* Chou expressly defines the upper bound gap stating “[t]his upper bound gap is defined as the number of data bits that the server's encoder buffer can contain over the bits currently contained therein after a just-generated frame is fully input into the buffer.” EX2016, ¶9; (citing EX1004, ¶24). Accordingly, $g(n-1)$ is not the number of bits in the decoder buffer – it is the number of bits that the encoder has available to be filled and, for the reasons explained below, a POSITA would understand that “ $g(n-1)$ ” is independent of what is stored in the decoder buffer. EX2016, ¶¶8-11.

Paragraph 66 of Chou, which Petitioner relies upon for this new theory, explains that the fullness of the buffer is F^d – not $g(n)$ – and F^d is never used in the process of determining the code rate. EX2016, ¶¶18-19. Instead, Chou confirms that it is the “**encoder** buffer parameters and the upper bound gap values **to determine** on a frame-by-frame basis the coding bit rate” and not any **decoder (client)** buffer parameters, as Petitioner argues. EX1004, ¶25.

As background, Chou derives equation (10) that “can” express $F^d(n)$ from assumptions that Chou expressly provides for equation (10) – namely, that encoding and decoding is instantaneous, and the encoder and decoder buffers are “complementary.” EX2016, ¶¶12-16. But a POSITA would understand, and, importantly, Chou itself confirms, that these assumptions are theoretical and do not hold in practice. *Id.*

As Dr. Cooperstock explains, the encoder and decoder buffers will not be “complementary” because there is no information known about the decoder buffer (*i.e.*, regarding the build-up or run-out of data). EX2016, ¶¶14-15. The gap $g(n-1)$ is sent **to the client** from the server, it is **never** sent from the client to the server, thus it does not (and cannot) have any actual information regarding the decoder buffer. *Id.* In practice, a POSITA would recognize that the fullness of the decoder buffer will be affected by (1) the speed of playback; (2) any trick play (*i.e.*, a pause, a seek, etc.); and (3) frames that have been stored and not played back yet. *Id.*

Moreover, a POSITA would recognize that the real-world networking conditions (*i.e.*, network latency, etc.) would prevent equation (10) from holding under real-world conditions because the “leak rate” of the encoder buffer (or arrival rate to the decoder buffer) will in-fact not be consistent. EX2016, ¶16.

Lastly, a POSITA would recognize that Chou itself confirms that F^d could not be accurately represented by the sum of $g(n-1) + r_c(n)/f(n)$, otherwise there would be

no need for the server to transmit $g(n)$ to the client or the *encoder* fullness to be “simulated” by the client to interpolate $g(n)$ when the server cannot send $g(n)$, as Chou requires. EX2016, ¶17. A POSITA would understand that there would be no reason for the server to send $g(n-1)$ or $g(n)$ to the client if it accurately represented the fullness of the decoder buffer, which the client could determine itself. EX2016, ¶17.

Second, the Reply admits that $g(n-1)$ is **in bits** and **not time**, which Petitioner suggests does not matter because “it can be readily converted.” Reply 14, 15. Yet, this conclusory statement is insufficient. Dr. Reader himself admitted that one would need to know “the code rate r_c ” of each frame in the buffer that has not been played back yet to make this conversion. EX1040, ¶13; EX2016, ¶¶20-21. However, Petitioner provides no explanation as how “ $g(n-1)$,” which is transmitted **from the server to the client**, would convey such information for past frames in the buffer or, more importantly, why a POSITA would be motivated to do so. *Id.*; TQ *Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1357 (Fed. Cir. 2019) (conclusory testimony and is not substantial evidence). Accordingly, Petitioner’s new theory fails on the merits for the additional reason that $g(n-1)$, even if it were the actual buffer fullness (it is not), is not a “a time available for reproducing the content” as claims require.

Moreover, since Chou fails to disclose or suggest that F^d or the “decoder buffer fullness” is in any way used in determining the code rate, a POSITA would

not be motivated to make necessary modification to use the actual “decoder buffer fullness” (in bits) to determine the “available time” and further use the available time to determine the code rate. EX2016, ¶¶20-21.

Third, Petitioner states that a “POSITA would have understood that when the Equation 18 accounts for the ‘playback deadline’ and ‘target schedule’ of Figure 5, it would factor in the client buffer size according to this model.” Reply 15, (citing EX1040, ¶14; EX1004, ¶67). This statement is supported only by a conclusory statement by Dr. Reader in his supplemental declaration, which contradicts his prior sworn testimony. EX2015, 99:5-12 (“Q. Does Chou disclose calculating the difference between the playback deadline and the arrival time, and if so, where? A. The difference of $[t_d(n) - t_a(n)]$ does not appear in the equations on page 9 in paragraph 68 [of Chou].”).

Dr. Reader’s new declaration fails to explain why or how Equation 18 would allegedly “account for the ‘playback deadline’ and ‘target schedule.’” EX1040, ¶14. Dr. Reader fails to explain any connection between “ $g(n)$ ” (alleged to be the client buffer duration at some points in the Reply) and “the gap between the frame’s arrival time and its playback deadline” (what Chou discloses to be the client buffer duration in paragraph [0067], which the Petition relies on as the “available time”). See EX1040, ¶¶6-18. Indeed, a POSITA would understand that equation (18) does not

“account” for the “playback deadline” and “target schedule” and that there is no connection between $g(n)$ and $t_d(n)-t_a(n)$. EX2016, ¶22.

In summary, Petitioner’s new theory relies on a flawed analysis of Chou’s description of gap $g(n-1)$ is supported by only conclusory statements. Petitioner’s new theory fails on the merits and Dr. Reader’s gap filling cannot save it. *See, e.g.*, EX1040, ¶¶13 (“a POSITA would be able to...”); 15 (“a POSITA would have understood”), 16 (“a POSITA would have been able to easily modify Equations 18 and 19”); Reply, 10-17; *TQ Delta*, 942 F.3d at 1357.

3. Petitioner’s rebuke of Chou’s “target buffer duration”

Petitioner criticizes PO as “mischaracteriz[ing] both the Petition and the Board’s decision” and alleges that PO “accuses the Board of improperly adopting arguments on Petitioner’s behalf.” Reply, 9-10. But Petitioner’s criticisms and allegations are unfounded. Petitioner’s own expert, Dr. Reader, expressly identified “the target buffer duration” as one of three different gaps that allegedly meet the “available time.” EX2015, 142:24-143:2; *see also* 153:23-154:15 (Dr. Reader stating that the available time is met by (1) $t_b(n)-t_a(n)$; (2) $t_d(n)-t_b(n)$; and (3) the target buffer duration ($t_d(n)-t_T(n)$). PO has responded to each of these allegations, which Petitioner inexplicably now criticizes as a “red herring.” Reply, 9-10. To the contrary, Petitioner’s inability to clearly identify the claimed “available time”

demonstrates that Chou does not disclose this limitation, much less determining a code rate using the “available time.”

4. Chou’s “one frame delay”

Petitioner argues that what it alleges to be “available time” in Chou accounts for Chou’s disclosure of a “one frame delay.” Reply, §III.C.A. Petitioner focuses on an annotated Figure 5 from Chou and a conclusory allegation that “when determining $r_c(n)$,” $t_d(n-2)-t_a(n-2)$ is the available time. Petitioner fails to address PO’s arguments that (1) this value is never calculated, much less used as an input to determining the code rate for frame (n), and (2) this value does not correspond to the “available time” because it is not based on “the content data stored in the storage device.”

Petitioner’s argument that its annotated Fig. 5 “is no different than the server than the server described in the ’101 Patent” ignores critical differences between the specification of the ’101 Patent and Chou. The ’101 Patent teaches, in exemplary embodiment, “acquiring the available reproduction time” and transmitting it to the server so that the server can determine the code rate based on the acquired value. In contrast, Chou does not disclose “acquiring” the value of $t_d(n-2)-t_a(n-2)$ or transmitting it back to the server, and Petitioner does not cite to any evidence that Chou does. Indeed, Dr. Reader was questioned about this and admitted that it is not. EX2015 99:5-12 (“Q. Does Chou disclose calculating the difference between the

playback deadline and the arrival time, and if so, where? A. The difference of [$t_d(n) - t_a(n)$] does not appear in the equations on page 9 in paragraph 68 [of Chou].”).

B. Chou does not disclose “determining the code rate based on a remaining time.”

Petitioner alleges that PO’s arguments are based on an incorrect view of Petitioner’s arguments (Reply § III.B.2), but at the same time inexplicably agrees with PO’s identification of what a “remaining time” in Chou would be (Reply § III.B.1). However, Petitioner fails to address PO’s argument that such a “remaining time” is never taught to be used to determine the code rate, as evidenced by at least the fact that Chou never suggests determining that value. Instead, Petitioner introduces a new variable $t_{\text{present}}(n)$, redraws Figure 5 with its own annotations, and concludes that the newly drawn gap “is consistent with the ‘gap’ referenced in the Petition.” Reply 19-20. But Petitioner’s “gap” referenced in the Petition, does not ever mention $t_{\text{present}}(n)$ or provide any rationale as to how Chou is considering the “remaining time” from the “present moment.” Pet., 37. Moreover, in its reply, Petitioner introduces new arguments that equation (18) of Chou supports its position, but, as shown below, fails to show how Equation (18) considers the “present moment” relative to the “reproduction start time.” Reply, 22. To the extent that Petitioner and Dr. Reader are implying that if “determining” *occurs* at a “present moment,” then the present moment is necessarily considered, that is not sufficient

for the code rate to be determined using the remaining time (*i.e.*, duration between reproduction start time and the present moment). EX2016, ¶¶23-28.

1. Chou does not disclose a “remaining time” or that the “code rate is determined based on” the “remaining time”

Petitioner’s theory, as explained in its Reply, is that “First” Chou considers the duration from the present moment to the upper bound,⁵ “Second” Chou attempts to control the upper bound to the target schedule, and third that Chou separately determines the “target buffer duration” to be a difference between the playback deadline and the target schedule. Reply, §III.B.3. Petitioner then uses these three separate teachings to reach a generalized conclusion that Chou’s determination of the code rate is done using the remaining time. *Id.* Not so.

Petitioner states that “Equation (18)” compares the present moment $t_{present}(n)$ “for frame (n)” to the upper bound $t_b(n)$ “for frame (n).” Reply, 22. Accordingly, accepting this as true *arguendo*, Petitioner admits that Equation 18 does not compare the present moment $t_a(n-2)$ to $t_b(n)$. This is fatal to Petitioner’s position because Petitioner’s conclusion assumes that $t_b(n)$ is (or becomes) equal in a hypothetical situation to $t_r(n)$. Reply, 23. But Petitioner fails to provide any evidence or rationale

⁵ The Petition does not explain this position, nor cite to any evidence that Petitioner now relies upon. Pet. 34-38.

that a comparison between the arrival time of frame (**n-2**), $t_a(n-2)$ (*i.e.*, the present moment), is compared to (or even considered by) the upper bound of frame (**n**), $t_b(n)$. Indeed, Chou never suggests comparing $t_a(n-2)$ to the upper bound ($t_b(n)$) *two frames later* (which is likely why Petitioner changes its nomenclature from $t_a(n-2)$ to $t_{present}(n)$, obfuscating this fatal flaw). EX2016, ¶¶25-26. Notably, here, Petitioner does not even attempt to address “Chou’s one frame delay” as it did for the available time. *Cf.* Reply, §III.A.4.

C. Petitioner’s other arguments

First, Petitioner’s argument that Dr. Cooperstock’s available time calculation is incorrect is flawed for the same reasons discussed above. Reply, §III.C.1. Dr. Reader argues that the “available time” as demonstrated in Dr. Cooperstock’s table is incorrect by relying on its new theory regarding “ $g(n)$ ” of Chou because “NEC and Dr. Cooperstock assume that frame (n-2) is part of the client buffer duration.” *Id.* But as explained above, “ $g(n-1)$ ” is not the “client buffer duration.” *See supra* §IIIA.2.

Second, PO does not mischaracterize the Board’s analysis of the Chou’s fast-startup technique as Petitioner contends. Instead, as explained in the POR, Chou’s technique determines the code rate based only on “an arrival rate” and/or a “playback rate.” EX1004, ¶90. Thus, Chou’s fast startup technique does not disclose determining the code rate based on an available time.

Third, Petitioner argues that NEC's examples demonstrating that Chou's "client buffer duration" is not the claimed available time should be ignored because the examples are "special cases." Reply, §III.C.3. Not so. Notwithstanding the fact that this value is never used in the process of determining the code rate, Petitioner misses the point. PO is not arguing that only in "special cases" Chou's disclosed "client buffer duration" is not the "available time." Instead, PO's argument is that Chou's disclosed "client buffer duration" is not a "time available for reproducing the content based on the content data stored" in the buffer and PO's examples demonstrate this. EX2012, §V.B.3.b. In particular, the examples demonstrate that Chou's "client buffer duration" does not use the "content data [that is] stored" in the buffer. *Id.* Instead, Chou the gap (even it were used in determining code rate, which it is not) is agnostic to any of the "content data" that is already "stored." EX2012, §V.B.3.

Contrary to Petitioner's argument, as PO explained, a value of Chou's "client buffer duration," at best, may match a value determined as the claimed available time, but such cases are indeed only based on "possibilities or probabilities."

IV. CHOU AND WANG DO NOT DISCLOSE LIMITATION 1[D]

Ground 2 of Petition alleged that the combination of Chou and Wang render obvious Claim 1. In the ID, the Board found that there would not be a motivation to combine Chou and Wang. In the POR, PO included these arguments along with

additional arguments against the Chou and Wang combination. Petitioner does not advance any arguments regarding Ground 2. Thus, the Board should find that there would be no motivation to combine the references for at least the same reasons it identified in the ID.

V. CONCLUSION

For the reasons set forth herein, the petition should be denied.

Date: October 4, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the foregoing Patent Owner Response, exclusive of the exempted portions as provided in 37 C.F.R. § 42.24(a), contains no more than 5,599 words and therefore complies with the type-volume limitations of 37 C.F.R. § 42.24(b).

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105(a), this is to certify that I caused to be served a true and correct copy of the foregoing “PATENT OWNER’S SUR-REPLY” via the PTAB’s E2E system and sent via email as detailed below.

Date of service: October 4, 2024

Documents served: PATENT OWNER’S SUR-REPLY

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