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Paper 11
Date: November 13, 2020

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

MICROSOFT CORPORATION,
APPLE INC., and ERICSSON INC.,
Petitioner,

v.

UNILOC 2017 LLC,
Patent Owner.

IPR2019-00973[1]
Patent 7,075,917 B2

Before SALLY C. MEDLEY, KALYAN K. DESHPANDE, and ROBERT J. WEINSCHENK, *Administrative Patent Judges*.

MEDLEY, *Administrative Patent Judge*.

JUDGMENT
Final Written Decision
Determining All Challenged Claims Unpatentable
35 U.S.C. § 318(a)

[1] Apple Inc., who filed a petition in IPR2020-00224, has been joined as a petitioner in this proceeding. Ericsson Inc., who filed a petition in IPR2020-00315, has been joined as a petitioner in this proceeding.

I. INTRODUCTION

Microsoft Corporation ("Petitioner") filed a Petition for *inter partes* review of claims 1–3, 9, and 10 of U.S. Patent No. 7,075,917 B2 (Ex. 1001, "the '917 patent"). Paper 2 ("Pet."). Uniloc 2017 LLC ("Patent Owner") filed a Preliminary Response. Paper 6 ("Prelim. Resp."). Upon consideration of the Petition and Preliminary Response, we instituted *inter partes* review, pursuant to 35 U.S.C. § 314, as to claims 1–3, 9, and 10 based on the sole challenge set forth in the Petition. Paper 7 ("Decision to Institute" or "Dec.").

Subsequent to institution, Patent Owner filed a Patent Owner Response (Paper 9, "PO Resp."), Petitioner filed a Reply to Patent Owner's Response (Paper 12, "Pet. Reply"), and Patent Owner filed a Sur-reply (Paper 13, "Sur-reply"). On August 20, 2020, we held an oral hearing. A transcript of the hearing is of record. Paper 19 ("Tr.").

In our Scheduling Order, we notified the parties that "any arguments not raised in the [Patent Owner] response may be deemed waived." *See* Paper 8, 7; *see also* Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,766 (Aug. 14, 2012) ("The patent owner response . . . should identify all the involved claims that are believed to be patentable and state the basis for that belief."). Patent Owner argues that it "does not concede, and specifically denies, that there is any legitimacy to any arguments in the instant Petition that are not specifically addressed" in its Patent Owner Response. PO Resp. 47 n.1; *see also id*. at 14–15. We decline to speculate as to what arguments Patent Owner considers illegitimate in the Petition. Any arguments for patentability not raised in the Patent Owner Response are deemed waived.

For the reasons that follow, we conclude that Petitioner has proven by a preponderance of the evidence that claims 1–3, 9, and 10 of the '917 patent are unpatentable.

A. Related Matters

The parties indicate that the '917 patent is the subject of several court proceedings, including *Uniloc 2017 LLC v. Microsoft Corporation*, 8:18-cv-002053 (C.D. Cal.), filed November 17, 2018. Pet. vii; Paper 3, 2; Prelim. Resp. 14–15; *see also* Ex. 1011 (complaint). The '917 patent also was the subject of IPR2019-00259, where a decision to not institute *inter partes* review was rendered. *Apple Inc. v. Uniloc 2017 LLC*, IPR2019-00259 ("IPR259"), Paper 7 (PTAB June 27, 2019) (Decision Denying Institution) ("IPR259 Dec."). In IPR2020-00224, Apple Inc. filed a motion to join this proceeding, which we granted. *See Apple Inc. v. Uniloc 2017 LLC*, IPR2020-00224, Paper 10 (PTAB Apr. 6, 2020). In IPR2020-00315, Ericsson Inc. filed a motion to join this proceeding, which we granted. *See Ericsson Inc. v. Uniloc 2017 LLC*, IPR2020-00315, Paper 10 (PTAB Apr. 7, 2020).

B. The '917 Patent

The Specification of the '917 patent describes a wireless network comprising a radio network controller (RNC) and a plurality of assigned terminals, which are each provided for exchanging data and which form a receiving and/or transmitting side. Ex. 1001, 1:6–9. The '917 patent describes data transmitted using the hybrid Automatic Repeat Request (ARQ) method. *Id.* at 1:10–15. The '917 patent explains that an object of the invention is "to provide a wireless network in which error-affected data repeatedly to be transmitted . . . are buffered for a shorter period of time on

average." *Id.* at 1:64–67. This is done by storing abbreviated sequence numbers whose length depends on the maximum number of coded transport blocks to be stored, and transmitting coded transport blocks that include a packet data unit and an assigned abbreviated sequence number. *Id.* at 2:8–16. The use of abbreviated sequence numbers reduces the extent of information that is required to be additionally transmitted for managing transport blocks and packet data units and simplifies the assignment of the received acknowledge command to the stored transport blocks. *Id.* at 2:45–49. The '917 patent further describes that a receiving physical layer checks whether a coded transport block has been transmitted correctly, and, if so, a positive acknowledge signal ACK is sent to the sending physical layer over a back channel. *Id.* at 6:9–13. If the coded transport block has not been received error-free, a negative acknowledge command NACK is sent to the sending physical layer. *Id.* at 6:13–15.

C. Illustrative Claim

Petitioner challenges claims 1–3, 9, and 10 of the '917 patent. Claims 1, 9, and 10 are independent claims, and claims 2 and 3 depend directly from claim 1. Claim 1 is reproduced below, which includes changes made per a Certificate of Correction.

> 1. A wireless network comprising a radio network controller and a plurality of assigned terminals, which are each provided for exchanging data according to the hybrid ARQ method and which form a receiving and/or transmitting side, in which a physical layer of a transmitting side is arranged for
>
> storing coded transport blocks in a memory, which blocks contain at least a packet data unit which is delivered by an assigned radio link control layer and can be identified by a packet data unit sequence number,

> storing abbreviated sequence numbers whose length depends on the maximum number of coded transport blocks to be stored and which can be shown unambiguously in a packet data unit sequence number, and for
>
> transmitting coded transport blocks having at least an assigned abbreviated sequence number and
>
> a physical layer of a receiving side is provided for testing the correct reception of the coded transport block and for sending a positive acknowledge command to the transmitting side over a back channel when there is correct reception and a negative acknowledge command when there is error-affected reception.

Ex. 1001, 7:62–8:17, p.10.

D. Instituted Ground of Unpatentability

We instituted trial based on the sole asserted ground of unpatentability under 35 U.S.C.[2] as follows (Dec. 5, 28):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–3, 9, and 10	103(a)	TR25.825[3], Abrol[4]

[2] The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) ("AIA"), amended 35 U.S.C. §§ 102 and 103. Because the '917 patent has an effective filing date before the effective date of the applicable AIA amendments, we refer to the pre-AIA versions of 35 U.S.C. §§ 102 and 103.

[3] 3G TR 25.835 V1.0.0 (2000-09) – 3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Report on Hybrid ARQ Type II/III (Release 2000) (Ex. 1005, "TR25.835").

[4] US 6,507,582 B1, issued Jan. 14, 2003 (Ex. 1007, "Abrol").

II. ANALYSIS

A. Principles of Law

To prevail in its challenges to Patent Owner's claims, Petitioner must demonstrate by a preponderance of the evidence that the claims are unpatentable. 35 U.S.C. § 316(e) (2012); 37 C.F.R. § 42.1(d) (2018). A patent claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are such that the subject matter, as a whole, would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). The question of obviousness is resolved on the basis of underlying factual determinations including (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of ordinary skill in the art; and (4) when in evidence, objective evidence of nonobviousness.[5] *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill

In determining the level of ordinary skill in the art, various factors may be considered, including the "type of problems encountered in the art; prior art solutions to those problems; rapidity with which innovations are made; sophistication of the technology; and educational level of active workers in the field." *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995) (citation omitted). Petitioner relies on the testimony of Dr. Harry Bims, who testifies that a person having ordinary skill in the art would have had "a bachelors' degree in electrical engineering, computer science, or the

[5] Patent Owner does not present any objective evidence of nonobviousness as to the challenged claims.

equivalent and three years of experience working with wireless digital communication systems including physical layer of such systems." Pet. 27–28 (citing Ex. 1003 ¶ 27). Dr. Bims further testifies that "[a]lternatively, the skilled person would have had a master's degree in electrical engineering, computer science, or the equivalent with an emphasis on wireless digital communication systems." Ex. 1003 ¶ 27. The Petition further states that a person having ordinary skill in the art "would have had working knowledge of the hybrid ARQ methods described in the '917 patent and closely followed ARQ developments by 3GPP and other network standardization groups." Pet. 28 (citing Ex. 1001, 1:5–62, 5:13–36).

Patent Owner does not provide its own assessment of the level of ordinary skill in the art, but argues that the Petition fails to link the subject matter of hybrid ARQ methods to the identified levels of education and industry experience proposed by Petitioner. PO Resp. 14. Patent Owner has failed to show that such a linkage is necessary. Rather, in determining the level of ordinary skill in the art, we consider several factors, such as the type of problems encountered in the art and prior art solutions to those problems, as well as education and industry experience. Here, we agree with Petitioner and find that a person having ordinary skill in the art would have known of the hybrid ARQ methods described in the '917 patent and closely followed ARQ developments by 3GPP and other network standardization groups. Pet. 28 (citing Ex. 1001, 1:5–62, 5:13–36). Moreover, we adopt Dr. Bims's assessment of a person with ordinary skill in the art as it is consistent with the '917 patent and the asserted prior art. Ex. 1003 ¶ 27. We further note that the prior art of record in the instant proceeding reflects the appropriate level of ordinary skill in the art. *Cf. Okajima v. Bourdeau*, 261 F.3d 1350, 1354–55 (Fed. Cir. 2001) (holding the Board may omit specific findings as

to the level of ordinary skill in the art "where the prior art itself reflects an appropriate level and a need for testimony is not shown").

C. Claim Construction

In an *inter partes* review for a petition filed on or after November 13, 2018, "[claims] of a patent . . . shall be construed using the same claim construction standard that would be used to construe the [claims] in a civil action under 35 U.S.C. § 282(b), including construing the [claims] in accordance with the ordinary and customary meaning of such claims as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent." *See* Changes to the Claim Construction Standard for Interpreting Claims in Trial Proceedings Before the Patent Trial and Appeal Board, 83 Fed. Reg. 51,340, 51,358 (Oct. 11, 2018) (amending 37 C.F.R. § 42.100(b) effective November 13, 2018) (now codified at 37 C.F.R. § 42.100(b) (2019)); *see also Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–14 (Fed. Cir. 2005).

For purposes of this decision, we need not expressly construe any claim term. *See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (holding that "only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy")*; see also Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Matal*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs.* in the context of an *inter partes* review).

D. Asserted Obviousness of Claims 1–3, 9, and 10 over TR25.825 and Abrol

Petitioner contends claims 1–3, 9, and 10 are unpatentable under 35 U.S.C. § 103(a) as obvious over TR25.825 and Abrol. Pet. 29–68. In

support of its showing, Petitioner relies upon the declaration of Dr. Bims. *Id.* (citing Ex. 1003).

1. TR25.835 as Prior Art and What TR25.835 Describes

TR25.835 as Prior Art

We first address whether Petitioner has shown that TR25.835 is a prior art printed publication under 35 U.S.C. § 102. *See* 35 U.S.C. § 311(b) (2018). Petitioner bears the burden to prove that it is. *See* 35 U.S.C. § 316(e) (2018). Whether a document qualifies as a printed publication under 35 U.S.C. § 102 "is a question of law based on underlying findings of fact." *In re Enhanced Sec. Research, LLC*, 739 F.3d 1347, 1354 (Fed. Cir. 2014) (citing *In re Hall*, 781 F.2d 897, 899 (Fed. Cir. 1986)). The Federal Circuit "has interpreted § 102 broadly, explaining that even relatively obscure documents qualify as prior art so long as the public has a means of accessing them." *Id*. (citing *Hall*, 781 F.2d at 899).

> Our leading case on public accessibility is *In re Hall*, 781 F.2d 897 (Fed. Cir. 1986). In *Hall* we concluded that "a single cataloged thesis in one university library" constitutes "sufficient accessibility to those interested in the art exercising reasonable diligence." *Id.* at 900. Thereafter, in *Constant v. Advanced Micro–Devices, Inc.*, we explained that "[a]ccessibility goes to the issue of whether interested members of the relevant public could obtain the information if they wanted to." 848 F.2d 1560, 1569 (Fed. Cir. 1988). Therefore, "[i]f accessibility is proved, there is no requirement to show that particular members of the public actually received the information." *Id.*

Enhanced Sec. Research, LLC, 739 F.3d at 1354 (alterations in original). The determination of whether a document is a "printed publication" under 35 U.S.C. § 102 involves a case-by-case inquiry into the

facts and circumstances surrounding its disclosure to members of the public. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004).

TR25.835 is a technical report. Ex. 1005. Petitioner asserts that TR25.835 was "published by 3GPP in 2000 and publicly available on the 3GPP file server no later than September 13, 2000," and, thus qualifies as prior art "under at least Sections 102(a) and (b)." Pet. 10 (citing Ex. 1004 ¶¶ 12–24; Ex. 1005) (footnote omitted). The Petition is accompanied by a declaration from Mr. Friedhelm Rodermund. Ex. 1004.

TR25.835 bears a copyright date of 2000. Ex. 1005, 2–3. The front cover of the document includes the indicia that "[t]he present document has been developed within the 3rd Generation Partnership Project (3 GPP™)." *Id.* at 2. Mr. Rodermund testifies that (1) he worked as a project manager at the European Telecommunications Standards Institute ("ETSI") from June 1998 to December 2004; (2) at ETSI he was a project manager for "various ETSI Special Mobile Group ('SMG') and 3GPP working groups;" and (3) he has personal knowledge of 3GPP's standard business and records keeping practices during the same timeframe. Ex. 1004 ¶¶ 2, 6, 13.

According to Mr. Rodermund, 3GPP "is in the business of developing and maintaining cellular telecommunications standards" and publishes technical specifications, proposals, reports, and other documents related to the development of cellular telecommunications standards. *Id.* ¶¶ 13–14. Mr. Rodermund further avers that at least as early as December 1998, draft ("T-docs") and final versions of 3GPP documents were, and continue to be, made publicly available by 3GPP, from an FTP server, "which has always been easily accessible from [the 3GPP] website." *Id.* ¶¶ 15, 17. According to Mr. Rodermund, at least by December 1998, 3GPP's FTP server was freely accessible to the general public with no login, password, or

membership requirement. *Id.* ¶ 18. Based on Mr. Rodermund's testimony, "[b]y June 1999, 3GPP's ftp server was well-known to persons in the cellular telecommunications industry as a source of public information regarding industry standards and technological advances." *Id.* ¶ 20.

Mr. Rodermund further avers that by 1999, at least 100 companies were members of 3GPP (such as Samsung, Sony, Nokia, and Bosch), who regularly delegated multiple individuals to participate in 3GPP meetings. *Id.* ¶ 19. Mr. Rodermund testifies that pursuant to 3GPP's standard business practices, 3GPP working groups "sent emails notifying these individuals as soon as new or additional documents had been uploaded to 3GPP's ftp server" such that "some of the most interested members of the public—those working to develop standards for cellular telecommunication or working to implement the standards—were personally informed of their availability by email." *Id.*

Mr. Rodermund testifies that "Ex. 1005" is a true and correct copy of version 1.0.0 of technical report 3GPP TR 25.835, "which was published and freely available on 3GPP's ftp server by September 13, 2000." *Id.* ¶ 25. He further testifies that "[t]he document was presented as T-doc RP-000416 at the 3GPP TSG RAN#9 plenary meeting" held September 20–22, 2000 in Hawaii, "attended by 140 delegates from numerous companies." *Id.*

Patent Owner did not cross-examine Mr. Rodermund. His testimony stands unrebutted.

We find that Mr. Rodermund's testimony demonstrates his personal knowledge of the business practices of 3GPP for him to testify regarding such practices. Ex. 1004 ¶¶ 2, 6, 7, 13. We give substantial weight to Mr. Rodermund's testimony that (1) TR25.835 "was published and freely available on 3GPP's ftp server by September 13, 2000;" (2) emails were sent

to delegated individuals of at least 100 companies as soon as new or additional documents had been uploaded to 3GPP's ftp server; and (3) TR25.835 was presented at the 3GPP TSG RAN #9 plenary meeting, held September 20–22, 2000 in Hawaii and attended by 140 delegates from numerous companies. *Id.* ¶¶ 19, 25. We also give substantial weight to Mr. Rodermund's testimony, that "[b]y June 1999, 3GPP's ftp server was well-known to persons in the cellular telecommunications industry[6] as a source of public information regarding industry standards and technological advances." *Id.* ¶ 20. We find that a person having ordinary skill in the art at the time of the invention would have known of 3GPP's website and ftp server and that such server contained relevant information pertaining to cellular telecommunications industry. Pet. 27 (citing Ex. 1003 ¶ 27); Ex. 1004 ¶ 20. We further find that a person having ordinary skill in the art would have "closely followed ARQ developments by 3GPP and other network standardization groups." Pet. 28 (citing Ex. 1001, 1:5–62, 5:13–36).

Patent Owner makes several procedural arguments. PO Resp. 16–23, 30; Sur-reply 1–3. For example, Patent Owner argues that Petitioner fails to identify under which pre-AIA statutory provision (35 U.S.C. § 102(a) or 35 U.S.C. § 102(b)) TR25.835 qualifies as prior art. PO Resp. 16; Sur-reply 2–3. We disagree, as the Petition indicates that TR25.835 qualifies as prior art under both 35 U.S.C. § 102(a) and 35 U.S.C. § 102(b). Pet. 10. Moreover, the Petition explains that the "[p]re-AIA Section 102(b) time bars are

[6] Patent Owner does not contest that persons in the cellular telecommunications industry are persons of ordinary skill in the art. *See generally* PO Resp. We find that persons in the cellular telecommunications industry are persons of ordinary skill in the art. Ex. 1003 ¶ 27.

triggered off 'the date of the application for patent in the United States, not the date of the German application to which the '917 Patent alleges [priority]." *Id.* at 10 n.1 (citing 35 U.S.C. § 102(b)). Patent Owner, however, does not dispute Petitioner's representations or explain what more was needed by Petitioner. Accordingly, we disagree that "the Petition fails to specify the . . . statutory subsection under which TR25.835" qualifies as prior art or that the Petition "has prejudiced Patent Owner's ability to respond." Sur-reply 2–3.[7] Patent Owner also argues that the Petition fails to provide an analysis and explanation regarding why TR25.835 qualifies as prior art. PO Resp. 16–23, 30; Sur-reply 1–3. We are not persuaded by Patent Owner's arguments. Rather, we determine that Mr. Rodermund's declaration, along with the indicia on TR25.835 and the arguments provided in the Petition are sufficient.

Patent Owner argues that Mr. Rodermund does not establish that TR25.835 was publicly accessible based on meaningful indexing, cataloging, or other assistance, such that "an interested artisan, exercising reasonable diligence," would have been able to find TR25.835 by searching the 3GPP file server. PO Resp. 25–27. In particular, Patent Owner argues that Petitioner fails to provide testimonial or documentary evidence that email notifications were provided of an upload of TR25.835 to the 3GPP server. *Id.* at 28.

[7] Here, the date of the application for patent in the United States of the '917 patent is October 9, 2001. Ex. 1001, code (22). Petitioner contends, and Patent Owner does not dispute, that the 35 U.S.C. § 102(b) bar date is October 9, 2000. Pet. Reply 4; Sur-reply 2–3. Petitioner further contends, and Patent Owner does not dispute, that the 35 U.S.C. § 102(a) date is October 9, 2001. Pet. Reply 4–5; Sur-reply 2–3.

We are not persuaded by Patent Owner's argument that Mr. Rodermund's testimony is insufficient because he did not testify, or provide documentary evidence, that email notifications were provided of the actual upload of TR25.835 to the 3GPP server. *Id.* Here, Mr. Rodermund's testimony sufficiently demonstrates his personal knowledge of the business practices of 3GPP for him to testify regarding such practices. Ex. 1004 ¶¶ 2, 6, 7, 13. He explains the general practice of emailing persons having ordinary skill in the art as soon as new or additional documents are uploaded to 3GPP's ftp server. *Id.* ¶ 19.[8] We give substantial weight to Mr. Rodermund's testimony that persons having ordinary skill in the art were notified by email as soon as new documents, like TR25.835, were uploaded to 3GPP's ftp server based on his personal knowledge of the business practices of 3GPP. *Id.*; *see Hall*, 781 F.2d at 899 (accepting evidence regarding the general library procedure for cataloging as probative value of routine business practice to show the performance of the specific act of cataloging a document). *In re Klopfenstein*, 380 F.3d 1345, 1350–51 (Fed. Cir. 2004) ("Evidence of routine business practice can be sufficient to prove that a reference was made [publicly] accessible.").

We also are not persuaded by Patent Owner's argument that even if an email notification had been provided to member companies, such an email distribution does not establish that an ordinarily skilled artisan could have accessed TR25.835 by exercise of reasonable diligence. PO Resp. 29. In particular, Patent Owner argues that "the email notifications were [restrictive and] limited to individuals delegated by respective member companies to

[8] Mr. Rodermund further testifies that TR25.835 was published and freely available on 3GPP's ftp server by September 13, 2000. *Id.* ¶ 25.

regularly participate in 3GPP meetings." *Id.* at 29–30. Patent Owner provides no evidence that the email notifications were restrictive or limited or even explain what Patent Owner means by such argument.

Mr. Rodermund's testimony that emails were sent to delegated individuals of at least 100 companies as soon as new or additional documents had been uploaded to 3GPP's ftp server stands unrebutted. Ex. 1004 ¶ 19.

Mr. Rodermund's testimony that TR25.835 "was published and freely available on 3GPP's ftp server by September 13, 2000" stands unrebutted. *Id.* ¶ 25. Patent Owner directs us to no evidence in support of its apparent argument that the persons that received emails about new documents, like TR25.835, were only those who created the document. PO Resp. 29. The unrefuted testimony of record indicates that several hundred representatives, that were persons having ordinary skill in the art, received email notification when new documents, like TR25.835, were uploaded to 3GPP's ftp server. Ex. 1004 ¶ 19.

Patent Owner further argues Petitioner fails to show that TR25.835 became publicly accessible at a 3GPP meeting, because there is no evidence corroborating the occurrence, dates, location, or subject of the meeting, and because Mr. Rodermund does not state that he personally attended the meeting. PO Resp. 30–31. We are not persuaded by Patent Owner's argument that Mr. Rodermund's testimony is insufficient because he did not testify that he attended the 3GPP meeting. *Id.* Again, Mr. Rodermund's testimony sufficiently demonstrates his personal knowledge of the business practices of 3GPP for him to testify regarding such practices. Ex. 1004 ¶¶ 2, 6, 7, 13, 22. In particular, we give substantial weight to Mr. Rodermund's unrebutted testimony that documents are routinely uploaded to 3GPP's ftp server and website before a meeting where they are to be discussed. *Id.*

¶ 22. We further give substantial weight to Mr. Rodermund's testimony that TR25.835 was publically available on 3GPP's ftp server by September 13, 2000 and that TR25.835 was presented at the 3GPP TSG RAN#9 meeting, held September 20–22, 2000 in Hawaii, attended by 140 delegates from numerous companies based on his personal knowledge of the business practices of 3GPP. *Id.* ¶ 25.

In connection with its Reply, Petitioner introduces a supplemental declaration from Mr. Rodermund (Ex. 1033) along with several documents in support of Mr. Rodermund's supplemental declaration. Pet. Reply 6. Patent Owner argues that we should not consider Petitioner's improper new arguments and new evidence. Sur-reply 2, 6. We disagree that Petitioner's arguments and supporting evidence in connection with its Reply are improper.

Petitioners are not prohibited from relying on new evidence and arguments in a reply, if the evidence and arguments are responsive to arguments made in a patent owner response. *See* 37 C.F.R. 42.23(b); Patent Trial and Appeal Board Consolidated Trial Practice Guide ("Consolidated Practice Guide") 73 (Nov. 2019)[9]; *Hulu, LLC. v. Sound View Innovations, LLC*, IPR2018-01039, Paper 29 at 15 (PTAB Dec. 20, 2019) (precedential) ("For example, if the patent owner challenges a reference's status as a printed publication, a petitioner may submit a supporting declaration with its reply to further support its argument that a reference qualifies as a printed publication"). Here, we determine that Petitioner's arguments and new evidence in connection with the Petitioner Reply are responsive to Patent Owner's challenges to TR25.835's status as a printed publication.

[9] Available at https://www.uspto.gov/TrialPracticeGuideConsolidated.

For instance, Patent Owner argues that Mr. Rodermund's testimony is not reliable because he failed to provide documentary evidence that email notifications were provided of the actual upload of TR25.835 to the 3GPP server. PO Resp. 28. In response, Petitioner provides a supplemental declaration from Mr. Rodermund who testifies that an email (Exhibit 1022) was sent on September 15, 2000 by the RAN WG2 secretary to around 1000 persons subscribed to the 3GPP RAN2 email exploder list, announcing the upload of TR25.835 to the 3GPP ftp server. Ex. 1033 ¶ 22; Ex. 1022; *see also* Pet. Reply 8. We disagree with Patent Owner that the content of Mr. Rodermund's supplemental declaration should have been presented in connection with the Petition, because, as we state above, it was not necessary for Mr. Rodermund to provide actual proof of an email alerting those of ordinary skill in the art that TR25.835 had been uploaded to the 3GPP ftp server. Moreover, Patent Owner could have cross-examined Mr. Rodermund, but did not do so. Nor did Patent Owner request to submit new testimony in support of its Sur-reply.

Next, Patent Owner makes several evidentiary objections to Petitioner's Reply exhibits. Sur-reply 2, 12–13. A party wishing to challenge the admissibility of evidence "must file any objections within five business days of service of evidence to which the objection is directed." Consolidated Practice Guide 78–79 (citing 37 C.F.R. § 42.64(b)(1)). Patent Owner, however, did not file any objections within five business days of service of the Reply evidence. Tr. 19:25–20:7. Rather, Patent Owner, for the first time, presents its evidentiary objections in connection with its Sur-reply. By disregarding the rules, Patent Owner prevented Petitioner from serving supplemental evidence, and filing an opposition to a motion to exclude as permitted. 37 C.F.R. §§ 42.64(b)(2), 42.64(c); Paper 8, 8–9.

Patent Owner's evidentiary objections, therefore, are not timely and we do not, nor need not, consider them.

In its Reply, Petitioner contends that "anyone could easily subscribe to and access the 3GPP email listservs (aka 'exploders') relating to the technology discussed in TR25.835" and that the relevant working group connected to such technology was "TSG RAN Working Group 2." Pet. Reply 7 (citing Ex. 1001, 1:10–15; Ex. 1006, 1; Ex. 1033 ¶¶ 6–12, 15–19). Petitioner further contends, and we agree, that a person having ordinary skill in the art would have known that the relevant listservs were "3GPP-_TSG_RAN_WG2 and 3GPP_TSG_RAN." *Id.* (citing Ex. 1033 ¶¶ 11–13). We give substantial weight to Mr. Rodermund's testimony that "the 3GPP-_TSG_RAN_WG2 email exploder had over 1000 subscribers, and the 3GPP_TSG_RAN email exploder had over 800 subscribers who all received such emails." Ex. 1033 ¶ 14 (citing Exs. 1015, 1016, showing ETSI's email list archives from August 2000 and October 2000). Petitioner further contends, and we agree, that a person having ordinary skill in the art would have easily located TR25.835 because in September, 2000, 3GPP emailed interested individuals (1) an attached copy of TR25.835; (2) notice that TR25.835 had been placed on the 3GPP ftp server; and (3) notice that documents for the RAN#9 plenary meeting were located on the ftp server. *Id.* at 8 (citing Exs. 1020–1023, 1025; Ex. 1033 ¶¶ 21–22).

Patent Owner argues that neither receiving group information (for the listserv) from 3GPP staff nor discovering in advance which one of dozens if not hundreds of email lists might possibly receive notice or dissemination via email rise to the level of public accessibility. Sur-reply 4–5. Patent Owner argues that Petitioner's Reply "is akin to arguing a library book located in a closet at a library could possibly be found by knowing one has

to join the correct email list in order to obtain the secret of where exactly to look." *Id.* at 5. Patent Owner also argues that the emails were sent to only select individuals, not the general public. *Id.* at 6. We are not persuaded by Patent Owner's arguments because Patent Owner fails to address, let alone rebut, Petitioner's supporting evidence.

We find that 3GPP was well known to those skilled in the art (Ex. 1001, 1:10–15; Ex. 1004 ¶ 20) and that a person having ordinary skill in the art would have closely followed ARQ developments by 3GPP (Pet. 28 (citing Ex. 1001, 1:5–62, 5:13–36)). We further find that the 3GPP TSG-RAN Working Group 2 was well known to those skilled in the art for developing ARQ techniques. Pet. Reply 7 (citing Ex. 1001, 1:10–15; Ex. 1006, 1; Ex. 1033 ¶¶ 11–12). It is not disputed that all 3GPP groups had at least one email exploder list to which delegates and *any interested individuals could subscribe to* for receiving and posting emails and the exploder lists were used to announce the distribution of documents. Ex. 1033 ¶ 6. We give substantial weight to Mr. Rodermund's testimony that "every email sent via the email exploder list is stored and maintained in a publicly-accessible email archive" and that by June 1999, "3GPP's email exploder lists and their archives were well-known to persons in the cellular telecommunications industry." *Id.* ¶¶ 6, 9–10. Petitioner contends, and we agree, that a person having ordinary skill in the art interested in the 3GPP TSG-RAN Working Group 2 would have known that the relevant email listservs were 3GPP_TSG_RAN_WG2 and 3GPP_TSG_RAN. *Id.* ¶¶ 11–13. We give substantial weight to Mr. Rodermund's testimony that each of the listservs 3GPP_TSG_RAN_WG2 and 3GPP_TSG_RAN had over 800 subscribers by late October 2000. *Id.* ¶ 14 (citing Ex. 1015; Ex. 1016).

Patent Owner presents no evidence to rebut the above findings of fact. Instead, Patent Owner's arguments are premised on the assumption that the relevant 3GPP listservs were wholly unknown to a person having ordinary skill in the art and akin to a public library holding a world of documents, where some are hidden in a closet. Sur-reply 5. Patent Owner's arguments are not supported by evidence.

With respect to the meeting where TR25.835 was presented (Ex. 1004 ¶ 25; Ex. 1033 ¶ 23), Patent Owner argues that a reference that was "allegedly presented does not necessarily mean that printed publications of the same were necessarily distributed to those in attendance." Sur-reply 8 (emphasis omitted).[10] Patent Owner does not address Mr. Rodermund's testimony that a September 15, 2000 "email announced the upload of documents and the document list ('Tdoc list') for the upcoming 3GPP TSG RAN#9 meeting to the 3GPP ftp server" that was held September 20–22, 2000. Ex. 1033 ¶ 23. Accordingly, we are not persuaded by Patent Owner's argument.

In summary, the supplemental testimony of Mr. Rodermund further supports our determination that TR25.835 is a prior art printed publication under 35 U.S.C. § 102. We give substantial weight to Mr. Rodermund's declarations. Ex. 1004; Ex. 1033. Together the declarations and supporting evidence establish that TR25.835 was publicly available as explained above. Patent Owner did not cross-examine Mr. Rodermund and his testimony stands unrebutted. Based on the record before us, we conclude that TR25.835 is a printed publication that was publicly available and obtained

[10] Contrary to Patent Owner's argument that Petitioner conceded that it does not rely on distribution of TR25.835 at a meeting, Petitioner never made such a concession. Pet. Reply 1, 7; Tr. 16:4–12.

by persons interested and ordinarily skilled in the art prior to the date of the involved patent.

What TR25.835 Describes

TR25.835 is a technical report describing "the results of the work on the work item 'Hybrid ARQ Type II/III'." Ex. 1005, 7. TR25.835 describes two alternative approaches to realize hybrid ARQ. *Id.* at 9. The first option "uses hybrid ARQ type II/III retransmissions at RLC layer," and the second option "uses hybrid ARQ type II/III retransmissions at Layer 1" that "adds fast hybrid ARQ type II/III functionality," e.g., fast HARQ or FHARQ. *Id.* at 9, 25–26.

TR25.835 describes that to perform the HARQ operation, the physical layer requires additional side information, e.g., sequence number and redundancy version. *Id.* at 26. "The selection of these parameters should be under the control of MAC but the actual parameter values are generated at L1." *Id.* The physical layer can encode the data and side information separately, and map them on one, or possibly even different physical channels. The receiver buffers and recombines the data. *Id.*

Figure 2 of TR25.835 is illustrated below.

Dotted lines in Figure 2 visualise the transport of necessary side information for fast hybrid ARQ operation. Solid lines show the transport of user data that is to utilize fast hybrid ARQ.

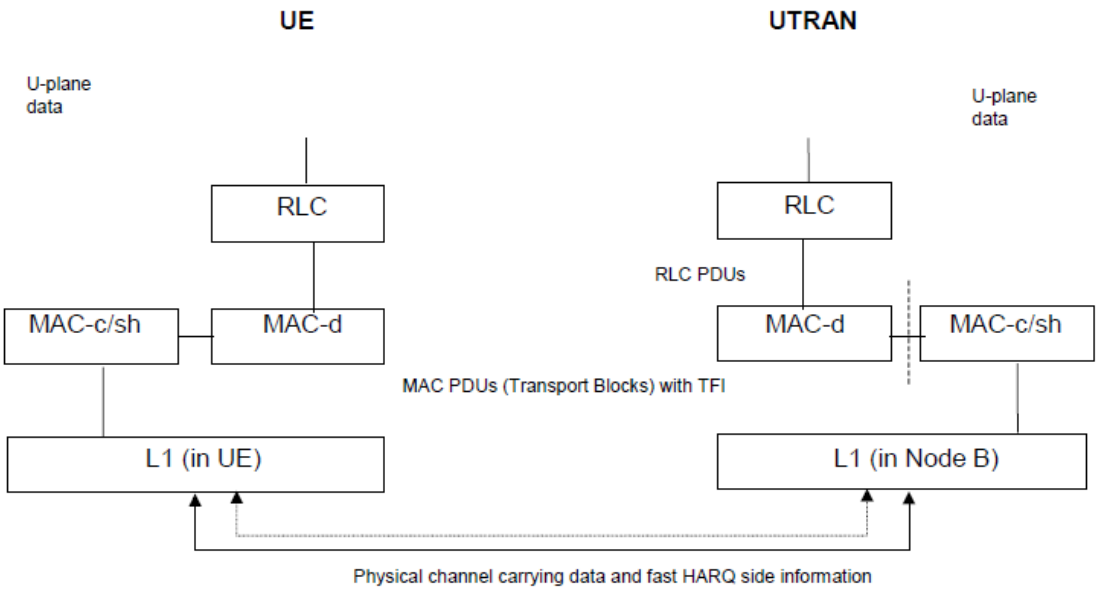


Figure 2 Protocol stack overview for fast hybrid ARQ type II/III.

Figure 2 of TR25.835 shows a physical channel. The dotted lines illustrate the transport of side information. *Id.* at 27.

2. Abrol

Abrol discloses a radio link protocol (RLP) that enables a transmission of a featureless byte stream. Ex. 1007, 3:24–26. According to Abrol, a shortened RLP sequence number is used, which is equal to the byte sequence number of the first data byte in the RLP frame divided by the page size. *Id.* at 6:52–55. In another embodiment, the most significant bits are omitted from the byte sequence number when such omission causes no ambiguity about which data is contained in the data portion of the RLP frame. *Id.* at 6:59–67.

3. Discussion

Claim 1 recites "[a] wireless network comprising a radio network controller and a plurality of assigned terminals, which are each provided for

exchanging data according to the hybrid ARQ method and which form a receiving and/or transmitting side, in which a physical layer of a transmitting side is arranged for."[11] Ex. 1001, 7:62–67. Petitioner contends that the '917 patent "admits that such a wireless network is disclosed in the earlier August 2000 version of TR25.835 (Ex. 1006)." Pet. 30–31 (citing Ex. 1006; Ex. 1001, 1:5–14). Petitioner further contends that chapters 1–6, 8, and 9 of TR25.835 contain all material aspects of chapters 1–8 of the earlier version (Ex. 1006) "admitted by the patent to describe the network recited in the preamble." *Id.* at 31 (citing portions from Ex. 1005 and Ex. 1006 ("the earlier version"); Ex. 1003 ¶ 60). Petitioner sufficiently makes a separate showing of how TR25.835 teaches a network controller, i.e., RNCs, along with transmitters and receivers that exchange data according to the hybrid ARQ method. *Id.* at 31–32 (citing Ex. 1005, 7, 8–11, 26–27, Tables 1–2, Figure 1; Ex. 1003 ¶ 61). Petitioner further contends, and we agree, that TR25.835 discloses a physical layer on both the transmitting/receiving sides depicted in Figure 1 as "L1." *Id.* at 32 (citing Ex. 1005, 11, Figure 1). Patent Owner does not dispute Petitioner's showing with respect to the preamble. *See generally* PO Resp.

Claim 1 further recites "storing coded transport blocks in a memory, which blocks contain at least a packet data unit which is delivered by an assigned radio link control layer and can be identified by a packet data unit sequence number." Ex. 1001, 8:1–4. Petitioner contends that TR25.835 describes the general mechanism for HARQ, which includes that for each packet data unit (PDU), "the CRC is added and the data is encoded with a

[11] We need not resolve the issue of whether the preamble is limiting because, regardless of whether the preamble is limiting, Petitioner shows that TR25.835 meets the preamble.

forward error correction (FEC) code. In the receiver, the FEC code is decoded and the quality of the packet is checked (CRC check). If there are errors in the packet, a retransmission of the packet (RLC-PDU) is requested." Pet. 33–34 (quoting Ex. 1005, 8) (emphasis omitted). Petitioner further contends that TR25.835 describes a "Fast Hybrid ARQ," which performs hybrid ARQ operations at "Layer 1," i.e., the physical layer. *Id.* at 34 (citing Ex. 1005, 25; Ex. 1003 ¶ 68).

In particular, Petitioner contends that the physical layer generates parameter values for side information, e.g., FHARQ sequence number and redundancy version and encodes the data and side information separately. *Id.* (citing Ex. 1005, 26–28). Petitioner also contends that TR25.835 Figure 2 shows how, in FHARQ, the physical layer receives the "PDUs (Transport Blocks)" from the MAC. *Id.* at 35 (citing Ex. 1005, Figure 2; Ex. 1003 ¶ 68). Petitioner contends that Table 1 shows network functions in the download (DL) direction, when Node B is sending information to the user device UE indicating that many of the ARQ functions are performed at Layer 1 and that the PDUs are delivered by the RLC layer, as Table 1 shows "TX buffering of RLC-PDUs" occurring at the RLC layer. *Id.* at 35–36 (citing Ex. 1005, 26 (Table 1); Ex. 1003 ¶ 69).

Petitioner explains, and we agree, that TR25.835's physical layer encoding of PDUs into coded transport blocks that include sequence numbers, redundancy values, and other ARQ information is consistent with how the '917 patent describes "coded transport blocks." *Id.* at 36–37 (citing Ex. 1001, 5:4–12; Ex. 1003 ¶ 70). Petitioner concludes, and we find persuasive, that TR25.835 discloses or at least renders obvious the claimed "coded transport blocks," which is confirmed by the '917 patent itself,

acknowledging that coded transport blocks were known in the art. *Id.* at 37 (citing Ex. 1001, 1:5–63, 4:35–5:35; Ex. 1003 ¶¶ 53–57, 71).

Petitioner contends, and we agree, that TR25.835 describes "storing coded transport blocks in a memory" because TR25.835 describes that the physical layer of the transmitting side is arranged for buffering user data including coded transport blocks. *Id.* at 37–39 (citing Ex. 1005, 26 (Table 1), 27; Ex. 1003 ¶ 73). We further agree with Petitioner that a person having ordinary skill in the art would have understood "buffering" to mean "storing" the coded transport blocks in a memory (buffer). *Id.* at 38–40 (citing Ex. 1001, 2:38–44; Ex. 1005, 17, 27–28; Ex. 1003 ¶ 74). Petitioner also presents evidence that a person having ordinary skill in the art would have understood that the coded transport blocks would be stored in the physical layer prior to transmitting data to the receiver. *Id.* at 40 (citing Ex. 1003 ¶ 74).

Petitioner contends, and we agree, that TR25.835 describes that a packet data unit is identified by a packet data unit sequence number. *Id.* at 40–41 (citing Ex. 1005, 8, 16; Ex. 1003 ¶ 75). Petitioner also contends that the '917 patent acknowledges that it was known from the earlier version of TR25.835 (Ex. 1006) that a packet data unit can be identified by a packet data unit sequence number. *Id.* (citing Ex. 1001, 4:35–5:32; Ex. 1003 ¶ 76). Patent Owner does not dispute Petitioner's showing with respect to "storing coded transport blocks in a memory, which blocks contain at least a packet data unit which is delivered by an assigned radio link control layer and can be identified by a packet data unit sequence number." *See generally* PO Resp.

Claim 1 further recites "storing abbreviated sequence numbers whose length depends on the maximum number of coded transport blocks to be

stored and which can be shown unambiguously in a packet data unit sequence number." Ex. 1001, 8:5–8. Petitioner contends that while TR25.835 describes a transmitter's physical layer adding, using, and storing sequence numbers, TR25.835 does not describe abbreviating its sequence numbers. Pet. 42.

Petitioner relies on Abrol for its teaching of abbreviating sequence numbers whose length depends on the maximum number of coded transport blocks to be stored. *Id.* at 47–51. First, Petitioner contends that Abrol describes a technique that includes "a shortened RLP sequence number . . . equal to the byte sequence number of the first data byte in the RLP frame divided by the page size. The number of bits required to represent a shortened RLP sequence number is fewer than the bits required to represent the actual byte sequence number." *Id.* at 47–48 (quoting Ex. 1007, 6:52–58) (emphasis omitted). Petitioner contends, and we agree, that the transmitted data frame dictates the maximum number of bytes to be stored because the transmitter must be able to store the data for each frame to ensure any lost bytes in the frame are retransmitted. *Id.* at 48 (citing Ex. 1003 ¶ 88). We further agree with Petitioner that by depending on the page size, which itself depends on the maximum number of coded transport blocks to be stored, Abrol's abbreviated number depends on the maximum number of coded transport blocks. *Id.*

Second, Petitioner contends, and we agree, that Abrol specifies to omit the most-significant bits from the sequence number based on the number of bytes that have not been acknowledged, i.e., the number of bytes that need to be stored for possible retransmission. *Id.* at 48–49 (citing Ex.

1007, 6:52–7:3; Ex. 1003 ¶ 89[12]). We agree that a person having ordinary skill in the art would have understood that the number of bytes outstanding is the number of bytes that need to be stored so that they can be retransmitted if a negative acknowledgment is received. *Id.* at 49 (citing Ex. 1007, 6:52–56; Ex. 1003 ¶ 89). We agree with Petitioner's showing that to eliminate ambiguity, the abbreviated sequence number must be able to identify the number of outstanding bytes that may need to be retransmitted. *Id.* (citing Ex. 1005, 9, 26–27; Ex. 1003 ¶ 89). Petitioner explains that the lower/higher the number of coded transport blocks that are buffered for transmission, the shorter/longer the particular abbreviated sequence number can be while still maintaining uniqueness. *Id.* Petitioner contends that as used in the FHARQ implementation described in TR25.835, the "outstanding" data bytes correspond to the buffered, coded transport blocks as each byte of data is transmitted in a coded transport block. *Id.* at 49–50 (citing Section IX.A.2.a of Petition; Ex. 1003 ¶ 89). Petitioner concludes, and we agree, that a person having ordinary skill in the art would have understood Abrol to teach that the abbreviated byte sequence numbers have a length dependent on the maximum number of coded transport blocks to be stored when the number of most significant bits in the byte sequence number is reduced. *Id.* at 50 (citing Ex. 1003 ¶ 89).

Third, Petitioner contends that Abrol teaches embodiments in which generation of shortened sequence numbers is achieved through simple omission of a fixed number of bits (4 or 12) from the full-length RLP sequence number. *Id.* at 50 (citing Ex. 1007, 6:59–7:3, 9:17–33). Petitioner

[12] Petitioner's citation to paragraphs 75 and 77 of Dr. Bims's declaration appears to be a typographical error.

contends, and we agree, that because the length of a full length RLP sequence number depends on the number of frames to be stored, and a shortened sequence number may be generated via a simple omission of a fixed number of bits, Abrol teaches abbreviated sequence numbers whose length depends on the maximum number of frames to be stored, and the page size. *Id.* at 50–51 (citing Ex. 1003 ¶ 91). Petitioner explains that longer sequence numbers would have been used when there were higher amounts of stored data in the form of coded transport blocks (i.e., blocks that had not been acknowledged) to avoid the ambiguity created by reused sequence numbers. *Id.* at 51 (citing Ex. 1007, 6:59–7:15, 4:49–62; Ex. 1003 ¶ 92).

Petitioner argues that a person having ordinary skill in the art would have been motivated to integrate Abrol's abbreviated sequence numbers into TR25.835's fast HARQ methods. *Id.* at 42–46. First, Petitioner argues that Abrol's benefit of "minimizing the overhead inherent" in error control protocols dovetails nicely with TR25.835's goal of more efficient and "fast hybrid ARQ" techniques. *Id.* at 43 (citing Ex. 1007, 1:7–11; Ex. 1005, 25–28). Petitioner contends, and we agree, that Abrol describes disadvantages of using larger numbers of bits in a sequence number such that fewer data bytes can be transmitted. *Id.* (citing Ex. 1007, 4:25–38). Petitioner further contends, and we agree, that Abrol proposes a technique that creates abbreviated sequence numbers, resulting in an ARQ that "transmit[s] a fraction of the sequence number bits in the majority of over-the-air frames." *Id.* (citing Ex. 1007, 4:25–38). Abrol describes that "the use of an 8-bit RLP sequence number is particularly advantageous, as 8-bit numbers are more easily manipulated by most modern microprocessors and in modem software." Ex. 1007, 9:28–31. Abrol further describes that "the enhanced

RLP protocol is designed to maximize the number of RLP frames transmitted with 8-bit RLP sequence numbers." *Id.* at 9:31–33. Petitioner contends that "[t]his is a 60% improvement over the standard 20-bit sequence number discussed in Abrol." Pet. 43 (citing Ex. 1007, 4:40–48). Notwithstanding Patent Owner's arguments, addressed below, Petitioner contends, and we agree, that Abrol's stated benefits would have motivated a person having ordinary skill in the art to incorporate Abrol's sequence number abbreviation techniques into the ARQ scheme prescribed by TR25.835. *Id.* (citing Ex. 1003 ¶ 81).

Petitioner further explains, and we agree, that a person having ordinary skill in the art would have been motivated to incorporate Abrol's approach of abbreviating sequence numbers into a fast HARQ implementation as taught by TR25.835, in order to reduce transmission overhead and increase the speed of ARQ acknowledgment. *Id.* at 43–44 (citing Ex. 1005, 25–27; Ex. 1007, 4:49–62, 6:59–67; Ex. 1003 ¶ 82). Petitioner further contends, and we agree, that a "POSITA would have recognized Abrol's teachings as wholly compatible with the fast HARQ implementation of TR25.835." *Id.* at 44–45. For example, Petitioner contends that Abrol's description that its technique of using abbreviated sequence numbers is applicable to any communication system is an express suggestion to use Abrol's abbreviated sequence numbers in the known 3GPP wireless communication network described in TR25.835. *Id.* (citing Ex. 1007, 3:32–36, 9:28–31; Ex. 1005, 26–28; Ex. 1003 ¶ 83). Lastly, Petitioner provides reasons why integrating Abrol's abbreviated sequence numbers into TR25.835's fast HARQ technology would have been a simple modification. *Id.* at 45–46 (citing Ex. 1003 ¶ 84).

Patent Owner argues that Petitioner has failed to show that a person having ordinary skill in the art would have found it obvious to modify TR25.835 using the teachings of Abrol. PO Resp. 31–38. First, Patent Owner argues "Petitioner fails to establish that a person having ordinary skill in the art, considering Abrol, which is specifically intended for use in channels of varying capacity, as a whole, would be likely to modify TR25.835." *Id.* at 32. Patent Owner further argues that Petitioner disregards Abrol's "problem of varying capacity, and Abrol's solution involving dividing large frames into small frames." *Id.* at 33; *see also id.* at 32–35. We are not persuaded by Patent Owner's arguments.

As explained in the Petition, Abrol describes, and we find, that its technique of using abbreviated sequence numbers "is applicable *to any communication system* employing transmission of a byte stream over a wireless channel" and is "applicable to . . . W-CDMA." Pet. 44–45 (citing Ex. 1007, 3:32–36, 9:28–31; Ex. 1005, 26–28; Ex. 1003 ¶ 83) (emphasis added). Petitioner has persuasively shown that W-CDMA "was known as a network protocol specified by 3GPP," providing specific motivation to apply Abrol's teachings of using abbreviated sequence numbers to TR25.835's fast HARQ system to increase speed and efficiency. *Id.*; Pet. Reply 11–12 (citing Ex. 1007, 2:40–46; Ex. 1005, 3, 27 (Figure 2); Ex. 1004 ¶ 1; Ex. 1032 ¶¶ 13–16; Ex. 1027, 8; Ex. 1028, 1 (WCDMA for UMTS)).

In its Sur-reply, Patent Owner argues that the statement in Abrol that its technique of using abbreviated sequence numbers "is applicable to any communication system employing transmission of a byte stream over a wireless channel" such as W-CDMA is taken out of context. Sur-reply 15 (citing Ex. 1007, 3:24–26) (internal quotations omitted). Patent Owner argues, when read properly, it is "axiomatic that Abrol's consistent

description of its system as requiring a varying channel capacity could not have been implemented on a channel that did not have such capacity." *Id.* We disagree that Abrol's description that its invention "is applicable *to any communication system* employing transmission of a byte stream over a wireless channel" only means systems that employ channels with varying capacity. Abrol itself does not so state. The sentence to which Patent Owner directs attention (Ex. 1007, 3:24–26) is several sentences prior to the one that states that the present invention "is applicable *to any communication system*." Patent Owner has not shown that the sentence it points to (*id*.) means that Abrol's invention "is [*only*] applicable to any communication system [*with a channel of varying capacity*] employing transmission of a byte stream over a wireless channel." We further note, that despite Patent Owner's argument that Abrol's invention requires a varying channel capacity, no Abrol claim recites "channel," let alone "varying channel capacity" or "channels with varying capacity." *Id.* at 13:29–16:10.

We give substantial weight to Dr. Bims's testimony that a person having ordinary skill in the art would have understood Abrol to expressly teach use of its invention (e.g., use of abbreviated sequence numbers to increase speed and efficiency) in a network such as the one described in TR25.835. Ex. 1003 ¶ 83 (quoting Ex. 1007, 3:32–35); Ex. 1032 ¶¶ 13–16. Dr. Bims's testimony stands unrebutted. On the other hand, we give little weight to Patent Owner's attorney arguments that a person having ordinary skill in the art would have understood Abrol to only apply to systems with "channels of varying capacity" or would have been discouraged from combining TR25.835 and Abrol. *See Estee Lauder Inc. v. L'Oreal, S.A.*, 129 F.3d 588, 595 (Fed. Cir. 1997) (argument of counsel cannot take the place of evidence lacking in the record). Absent testimonial evidence from an expert,

Patent Owner's arguments are mere attorney arguments that are not supported by evidence of record. Accordingly, we give substantial weight to the unrebutted testimony of Dr. Bims and little weight to Patent Owner's attorney arguments.

Additionally, even if Abrol "requir[es] a varying channel capacity," we agree with Petitioner, and find, that TR24.835's network had varying channel capacity (downlink shared channel (DSCH)). Pet. Reply 12–13 (citing Ex. 1005, 27; Ex. 1028, 77; Ex. 1032 ¶¶ 17–21). In particular, we give substantial weight to Dr. Bims's unrebutted testimony that it was "well-known that DSCH 'support[ed] . . . ***variable bit rate on a frame-by-frame basis***.'" Ex. 1032 ¶ 18 (quoting Ex. 1028, 77). And TR25.835 expressly states that its "Fast HARQ is planned to be employed on DSCH." *Id.* (citing Ex. 1005, 27) (emphasis omitted).

In its Sur-reply, Patent Owner first argues that Petitioner is "impermissibly" advancing new argument and evidence. Sur-reply 15–16. As explained in detail above, Petitioner has shown that Abrol describes that its invention is not limited to "requiring a varying channel capacity" as Patent Owner asserts. Petitioner's arguments are responsive to arguments advanced by Patent Owner, and, therefore, not "impermissible." 37 C.F.R. § 42.23(b). Moreover, Patent Owner could have cross-examined Dr. Bims, but did not do so. Nor did Patent Owner request to submit new testimony in support of its Sur-reply.

We also are not persuaded by Patent Owner's argument that TR25.835's description that fast HARQ "is ***planned to be*** employed on DSCH" is not an assertion "of what is expressly disclosed within the four corners of TR25.835." Sur-reply 16. Patent Owner's arguments focus only on the express description in TR25.835 without taking into account what a

person having ordinary skill in the art at the time of the invention would have known. Patent Owner does not address Petitioner's arguments and supporting evidence, which we find persuasive, that one of the common transport channels in 3G networks was DSCH and that it was well-known that DSCH supported variable bit rate on a frame-by-frame basis. Pet. Reply 12–13 (citing Ex. 1032 ¶ 18 (quoting Ex. 1028, 77).

Next, Patent Owner argues that Abrol teaches modifying RLP2 protocol by adding byte sequence numbers rather than frame sequence numbers in contrast with TR25.835's teaching of sequence numbers. PO Resp. 35. Patent Owner argues that a person having ordinary skill in the art "would not find it obvious to modify TR25.835 as Abrol provides for adding sequence numbers to constituents of frames," which "would result in unnecessary and additional data processing and transmission." *Id.* at 35–36. Patent Owner, however, does not direct attention to record evidence, such as in Abrol itself, that would lead a person having ordinary skill in the art to conclude that Abrol's teachings "would result in unnecessary and additional data processing and transmission." *Id.* For these reasons alone, we are not persuaded by Patent Owner's arguments. Additionally, we agree with Petitioner that "Abrol's solution actually *reduced* overall data processing and transmission by reducing transmission errors and, thus, avoiding the processing and transmission associated with additional retransmissions and lost data." Pet. Reply 15 (citing Ex. 1007, 3:52–4:24, 5:13–35, 7:18–23; Ex. 1032 ¶¶ 23–24) (emphasis in original). We further agree with Petitioner that Abrol teaches the use of abbreviated or shortened frame sequence numbers, whether for original transmissions or re-transmissions, which a person having ordinary skill in the art would have understood to be beneficial in a

communication system such as TR25.835's system. *Id.* at 16–17 (citing Ex. 1007, 4:37–39, 4:48–62, 6:52–7:30, 10:48–54; Ex. 1032 ¶¶ 25–31).

Patent Owner also argues that Petitioner fails to point to anything in TR25.835 that overhead is a concern in error control protocols or why TR25.835 would employ Abrol's advantageous 8-bit RLP sequence numbers. PO. Resp. 36. As pointed out by Petitioner, Abrol itself teaches that reducing sequence number overhead in error control allows for transmission of more data bytes in a given frame. Pet. 43 (citing Ex. 1007, 1:7–11); Pet. Reply 18 (citing Ex. 1007, 4:37–39). We give substantial weight to Dr. Bims's unrebutted testimony that overhead was a "concern in any wireless transmission system because with less overhead came more bandwidth for data, increasing overall data throughput and getting end users their information more quickly," because it is consistent with Abrol's teachings regarding overhead. Ex. 1032 ¶ 32 (citing Ex. 1007, 4:37–39); *see also* Ex. 1003 ¶ 81 (citing Ex. 1007, 1:7–11 (the present invention relates to "transmitting data through a wireless channel while minimizing the overhead inherent in the error control protocol")). We further agree with Dr. Bims that Abrol's teachings are general and not limited to any specific size of sequence number as Patent Owner asserts. Ex. 1032 ¶ 32 (citing Ex. 1007, 10:46–54 ("many other choices of sequence number sizes may be made without departing from the current invention")). On the other hand, Patent Owner's arguments are unpersuasive because they require bodily incorporating Abrol's specific 8-bit RLP sequence numbers embodiment into TR25.835 without considering what the combined teachings of Abrol and TR25.835 would have suggested to a person having ordinary skill in the art. *See In re Keller*, 642 F.2d 413, 425 (CCPA 1981).

Patent Owner further contends that Petitioner vaguely argues that TR25.835 achieves benefits by "creative use of sequence numbers," and points to the use of side information using sequence numbers, but does not explain what is creative about TR25.835's use of sequence numbers. PO Resp. 36 (citing Pet. 43–44; Ex. 1003 ¶ 82). We agree with Petitioner that in making such an argument, Patent Owner overlooks Petitioner's showing that TR25.835 uses sequence numbers in the physical layer to facilitate fast decoding at the receiver. Pet. Reply 18 (citing Pet. 43–44; Ex. 1005, 27; Ex. 1032 ¶ 33). Using Abrol's abbreviated sequence numbers "in [TR25.835's] network in order to reduce transmission overhead and increase speed of ARQ acknowledgment" would have been obvious to a person having ordinary skill in the art. Ex. 1032 ¶ 33.

Patent Owner further argues that Petitioner does not explain how Abrol's teachings of retransmission of entire large frames using 8-bit numbers, or division into small independent RLP frames, would be implemented in TR25.835. PO Resp. 36–37. We agree with Petitioner that Patent Owner overlooks the fact that Abrol was intended for W-CDMA networks, like that of TR25.835, and that a "POSITA would have had no issues integrating Abrol's abbreviated sequence number technique into such a network," as we have explained above in detail. Pet. Reply 19 (citing Sections IV.A, IV.C; Ex. 1032 ¶ 34). Lastly, Patent Owner argues that the '917 patent is much more detailed than Abrol in describing how to implement ARQ with abbreviated sequence patterns. PO Resp. 37–38. Patent Owner, however, points to descriptions that are no more specific than the limitations in the broad claims. *Id.* We agree with Petitioner that the '917 patent, thus, fails to describe details for how abbreviated sequence

numbers would be implemented in the prior art system cited in the '917 patent. Pet. Reply 19–20 (citing Ex. 1001, 1:5–15; Ex. 1032 ¶ 35).

Claim 1 further recites "transmitting coded transport blocks having at least an assigned abbreviated sequence number." Ex. 1001, 8:10–11. Petitioner relies on the combination of TR25.835 and Abrol to teach this claim phrase. Pet. 52. Petitioner contends that TR25.835 teaches that the physical layer of the transmitter transmits coded transport blocks (data long with side information, including sequence numbers). *Id.* at 52–54 (citing Ex. 1005, 8–9, 17–19, 25–27, Figures 1, 2, 5; Ex. 1003 ¶¶ 95–97). Petitioner further contends that as modified, the FHARQ of TR25.835 would transmit the Abrol abbreviated sequence numbers in lieu of the sequence numbers taught by TR25.835. *Id.* at 54 (citing Ex. 1003 ¶ 98; Section IX.A.3 of Petition).

Claim 1 recites "a physical layer of a receiving side is provided for testing the correct reception of the coded transport block." Ex. 1001, 8:12–13. Petitioner contends that the combination of TR25.835 and Abrol teaches the aforementioned limitation of claim 1. Pet. 54. More specifically, Petitioner contends TR25.835's fast HARQ method tests for the correct reception of the coded transport block at the physical layer of the receiving side. *Id.* at 54–55 (citing Ex. 1005, 27; Ex. 1003 ¶¶ 85, 99–100). According to Petitioner, TR25.835 expressly teaches that error detection is done at the physical layer of the receiving side and that a person having ordinary skill in the art would have understood Chapter 7 of TR25.835 to mean that the physical layer of the receiving side detects for errors in the coded transport blocks, especially in light of the background knowledge. *Id.* at 56 (citing Ex. 1001, 1:64–67, 6:1–15; Ex. 1003 ¶ 100).

Patent Owner argues that Petitioner fails to show that TR25.835 teaches or renders obvious "a physical layer of a receiving side is provided for testing the correct reception of the coded transport block." PO Resp. 38–43. We first address Patent Owner's argument that the Chapter 6, Figures 2 and 3 of TR25.835 describes that the acknowledgment messages are initiated by the MAC layers, not by the physical layer. *Id.* at 40–43. Figures 2 and 3 of TR25.835 Chapter 6 are directed to a different HARQ implementation than that of Chapter 7. The Petition cites TR25.835 Chapter 7 to meet the disputed limitation, not Chapter 6, Figures 2 and 3. Pet. 54–56. Thus, we are not persuaded by such arguments. Moreover, we disagree that "the Petition expressly purports to rely upon the very portions of TR25.835 that it now abandons, including when addressing the language of the preamble of claim 1 introducing the same 'physical layer' term." Sur-reply 23 (citing Ex. 1005, Figs. 2, 3). It is clear from the Petition that reference to Figures 2 and 3 of Chapter 6 is for illustrating that the *components* of the claimed "wireless network" in the preamble were known, as even admitted by the '917 patent. Pet. 33; *see also id.* 30–31 (citing Ex. 1001, 1:5–14). Notably, the Petition does not cite to TR25.835 Chapter 6, Figures 2 and 3 for teaching the functional language of the disputed claim 1 limitation. *Id.* at 54–56.

Next, although Patent Owner acknowledges that Section 7.2 of TR25.835 describes that "[t]he integrity of the packet is checked and an acknowledgment is sent in the current uplink frame," Patent Owner argues that "[t]his statement of receiver functions . . . says nothing about the allocation of functions among the physical layer, MAC and RLC." PO Resp. 39 (citing Ex. 1005, 27). We agree with Petitioner that Patent Owner

myopically focuses on this isolated statement without considering other TR25.835 cited passages. Pet. Reply 22.

Chapter 5 of TR25.835 describes an overview of Hybrid ARQ Type II/III and two alternative options to realize hybrid ARQ. Ex. 1005, 8–9. "The second option uses hybrid ARQ type II/III retransmissions *at Layer 1*," which "adds fast hybrid ARQ type II/III functionality to Node B," "described in chapter 7." *Id.* at 9. Chapter 7 is entitled "Layer 2 and Layer 3 Operation with Hybrid ARQ Type II/III Retransmission *at Layer 1* (Fast Hybrid ARQ)." *Id.* at 25 (emphasis added). TR25.835 Chapter 7 includes, under the headers "Functions of Layer 1" and "Services provided by the physical layer," the functions of "redundancy selection, TX buffering, retransmission control, RX soft decision buffering and combining for data;" "encoding/decoding, transmission, and error detection of fast HRQ side information (including fast acknowledgments);" and "generation of Acknowledgment PDU & Side Information." *Id.* at 27. The Petition cites all of these passages. Pet. 10–15, 54–56.[13]

We give substantial weight to Dr. Bims's testimony that a person having ordinary skill in the art would have understood TR25.835 to teach that its fast HARQ implementation uses the physical layer for a number of functions, including testing for correct reception of each bloc. Ex. 1032 ¶¶ 36–37. Dr. Bims testifies that the movement of certain functions to the physical layer was the purpose of fast HRQ, as it allowed error correction

[13] We disagree with Patent Owner that the Petition "focus[ed]" only on TR25.835's description of "error detection on fast HARQ side information (including fast acknowledgments)." PO Resp. 40; Sur-reply 22. It is clear from the Petition that Petitioner relied on the totality of at least the description found on page 27 of TR25.835; not on any single described physical layer function. Pet. 54–56.

decisions and ACK / NACK at the physical layer without the delay associated with waiting for the RLC or MAC layers to make decisions. *Id.* ¶ 36 (citing Ex. 1005, Chapter 5). Dr. Bims further testifies, and we agree, that TR25.835 describes that the physical layer generates "Acknowledgment PDU & Side Information." *Id.* ¶ 40 (citing Ex. 1005, 27). Dr. Bims further explains that a "POSITA would understand that, in order to generate acknowledgment PDUs and side information as expressly specified, the physical layer also performs integrity checking." *Id.* ¶ 41.

As explained above, TR25.835 expressly lists as functions of Layer 1, "RX soft decision buffering and combining for data" and "decoding." Ex. 1005, 27. We give substantial weight to Dr. Bims's testimony that a "POSITA would understand that decoding includes determining whether the encoded blocks were received without introduction of errors" and that "'soft decision buffering and combining' at the physical layer indicates a physical layer determination of which blocks had been correctly received, so that blocks could be properly buffered and then ultimately combined before being passed to higher protocol layers of the receiver." Ex. 1032 ¶ 41; *see also id.* ¶ 42 (explaining that the process of "soft decision buffering and combining" includes the physical layer deciding whether each block has been correctly received, since only correctly received blocks are buffered and then combined).[14] We agree with Dr. Bims that "TR25.835 further confirms that these functions are performed together at the physical layer by teaching that '[t]he integrity of the packet is checked and an acknowledgment is sent in the current uplink frame.'" *Id.* ¶ 41 (citing

[14] Patent Owner's argument (PO Resp. 39–40) that only buffering is achieved at the physical layer, ignores the description at page 27 of TR25.835 that "buffering *and combining*" are achieved at the physical layer.

Ex. 1005, 27). Substantial evidence supports Petitioner's contention that "TR25.835 further confirms that these functions [e.g., "soft buffering and combining" and "decoding"] are performed together at the physical layer by teaching that "[t]he integrity of the packet is checked and an acknowledgment is sent in the current uplink frame." Pet. Reply 23 (citing Ex. 1005, 27). In other words, and in light of all of the pertinent passages discussed above, we agree with Petitioner that a person having ordinary skill in the art would have understood TR25.835's description of checking the integrity of the packet and sending an acknowledgment is in connection with the physical layer (layer 1) performing such functions. *See, e.g.*, *id.* at 22 (citing Ex. 1032 ¶¶ 41–42).

Thus, notwithstanding Patent Owner's argument that TR25.835 does not describe "a physical layer of a receiving side is provided for testing the correct reception of the coded transport block," we are persuaded that Petitioner has shown, by a preponderance of evidence that TR25.835 combined with Abrol meets this limitation.

Claim 1 further recites "for sending a positive acknowledge command to the transmitting side over a back channel when there is correct reception and a negative acknowledge command when there is error-affected reception." Ex. 1001, 8:14–17. Petitioner contends, and we agree, that TR25.835 Chapter 7, Figure 1, describes sending positive and negative acknowledgements (ACK/NAK) and that the ACK/NAK process involves the physical layer of the receiving side reading the sequence number and redundancy version, checking the integrity of the packet (as explained above), and sending an acknowledgement message. Pet. 56–57 (citing Ex. 1005, 25–26).

Petitioner further explains, and we agree, that the physical layer on the receiver generates and sends acknowledgments (positive or negative acknowledgment) after checking the integrity of the transmitted data. *Id.* at 57–58 (citing Ex. 1005, 27; Ex. 1003 ¶ 102). Petitioner contends, and we agree, that such acknowledgments (positive and negative) also are described in the background art, as evidenced by Abrol. *Id.* at 58 (citing Ex. 1005, 27; Ex. 1007, 5:23–30, 10:60–61, 12:43–47; Ex. 1003 ¶ 103). Petitioner contends, and we agree, that to the extent TR25.835 does not expressly state that the "acknowledgment" commands are positive or negative, it would have been obvious to a person having ordinary skill in the art for the system to specifically provide for sending a positive acknowledge command where there is correct reception and a negative acknowledge command where there is error-affected reception. *Id.* at 58–59 (citing Ex. 1003 ¶ 104).

Petitioner further contends that TR25.835 discloses that the acknowledgments are over a back channel as required by claim 1. Petitioner explains, and we agree, that TR25.835 Figure 2 shows a "dotted line" channel (back channel) between the physical layers that transports "side information" which includes "fast acknowledgments." *Id.* at 59–60 (citing Ex. 1005, 25, 27 (Figure 2); Ex. 1003 ¶¶ 105–106). Patent Owner does not dispute Petitioner's showing with respect to this claim limitation. *See generally* PO Resp.

Independent claims 9 and 10 are similar to claim 1. Petitioner's showings for claims 9 and 10 are nearly the same as that for claim 1, while sufficiently accounting for differences between claims 9 and 10 and claim 1. *See* Pet. 62–68. Patent Owner's arguments for claims 9 and 10 are the same as its arguments for claim 1, which we have addressed. PO Resp. 33–34, 43.

Claim 2 depends from claim 1 and recites "that the radio network controller and the assigned terminals are provided for exchanging data according to the hybrid ARQ method of type II or III." Ex. 1001, 8:18–21. Petitioner contends, and we agree, that TR25.835 teaches exchanging data according to the hybrid ARQ method of type II and/or III. Pet. 60–61 (citing Ex. 1005, 8, 25–28). Claim 3 depends from claim 1 and recites "that the physical layer of a receiving side is provided for sending a positive or negative acknowledge command with the abbreviated sequence number of the transport block received correctly or affected by error." Ex. 1001, 8:22–26. Petitioner contends, and we agree, that TR25.835 teaches a physical layer of a receiving side sending a positive or negative acknowledge command. Pet. 61. Petitioner further contends, and we agree, that it would have been obvious to improve TR25.835's receiver to detect errors on side information (which includes abbreviated sequence numbers as taught by Abrol), and generate and return fast acknowledgments and side information for identification and retransmission by the transmitting side. *Id.* at 62 (citing Ex. 1005, 27; Ex. 1003 ¶¶ 108–109). We also agree that a person having ordinary skill in the art would have understood that the fast acknowledgments included positive and negative acknowledgments depending on whether the coded transport blocks were correctly received or not. *Id.* In addition, and alternatively, Petitioner contends, and we agree, that Abrol teaches sending a negative acknowledge command (NAK) "individually" for lost retransmit frames and that the NAKs are received back at the transmitting side indicating lost transmitted data. *Id.* (citing Ex. 1007, 5:23–30, 12:43–47; Ex. 1003 ¶¶ 108–109). Patent Owner does not contest claims 2 or 3 separately. PO Resp. 43.

In sum, having considered Petitioner's and Patent Owner's arguments and evidence, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 9, and 10 of the '917 patent would have been obvious over TR25.835 and Abrol.

E. Constitutional Challenge to Inter Partes Review

Patent Owner contends that the Board lacks constitutional power to issue a Final Written Decision in this proceeding under the Appointments Clause of the U.S. Constitution. PO Resp. 43–47. We decline to consider Patent Owner's constitutional challenge, as the issue has been addressed by the Federal Circuit in *Arthrex, Inc. v. Smith & Nephew, Inc.*, 941 F.3d 1320, 1328 (Fed. Cir. 2019), *cert. granted sub nom. United States v. Arthrex, Inc.*, 2020 WL 6037206 (Oct. 13, 2020).

III. CONCLUSION[15]

For the foregoing reasons, we determine that Petitioner has shown by a preponderance of the evidence that claims 1–3, 9, and 10 of the '917 patent are unpatentable, as summarized in the following table:

[15] Should Patent Owner wish to pursue amendment of the challenged claims in a reissue or reexamination proceeding subsequent to the issuance of this Decision, we draw Patent Owner's attention to the April 2019 *Notice Regarding Options for Amendments by Patent Owner Through Reissue or Reexamination During a Pending AIA Trial Proceeding*. *See* 84 Fed. Reg. 16654 (Apr. 22, 2019). If Patent Owner chooses to file a reissue application or a request for reexamination of the challenged patent, we remind Patent Owner of its continuing obligation to notify the Board of any such related matters in updated mandatory notices. *See* 37 C.F.R. § 42.8(a)(3), (b)(2).

Claims	35 U.S.C. §	Reference(s)/ Basis	Claims Shown Unpatentable	Claims Not Shown Unpatentable
1–3, 9, 10	103(a)	TR25.835, Abrol	1–3, 9, 10	
Overall Outcome			1–3, 9, 10	

IV. ORDER

Accordingly, it is:

ORDERED that claims 1–3, 9, and 10 of the '917 patent have been shown to be unpatentable; and

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

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