

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ERICSSON INC., and NOKIA OF AMERICA CORPORATION,
Petitioners,

v.

ACTIVE WIRELESS TECHNOLOGIES LLC.,
Patent Owner.

IPR2024-00951
Patent 10,531,443 B2

Before MONICA S. ULLAGADDI, DAVID COTTA, and
JASON M. REPKO *Administrative Patent Judges*.

COTTA, *Administrative Patent Judge*

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

I. INTRODUCTION

Ericsson Inc. and Nokia of America Corp. (collectively “Petitioner”) filed a Petition to institute an *inter partes* review (“IPR”) of claims 1–5 (the “challenged claims”) of U.S. Patent No. 10,531,443 B2 (“the ’443 patent”). Paper 1 (“Petition” or “Pet.”). Active Wireless Technologies LLC (“Patent Owner”) filed a Preliminary Response. Paper 7 (“Prelim. Resp.”). With our prior authorization, Petitioner filed a Preliminary Reply (Paper 8, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-reply (Paper 9, “Prelim. Sur-reply”).

Under 35 U.S.C. § 314(a), *inter partes* review may not be instituted unless the Petition “shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” Institution of an *inter partes* review is discretionary. *See* 35 U.S.C. § 314(a) (authorizing institution of an *inter partes* review under particular circumstances, but not requiring institution under any circumstances).

Patent Owner argues that the Board should exercise its discretion to deny institution in view of parallel district court litigation. Prelim. Resp. 21 (citing *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). The Board applies the *Fintiv* factors to determine whether to deny the petition for that reason. *See Fintiv*, Paper 11 at 5–6.

The Board will not discretionarily deny institution under the *Fintiv* factors when a petition presents “compelling evidence of unpatentability.” *CommScope Techs. LLC v. Dali Wireless, Inc.* IPR2022-01242, Paper 23 at 3 (Vidal Feb. 27, 2023) (precedential) (citing Katherine K. Vidal, Director of the USPTO, *Interim Procedure for Discretionary Denials in AIA Post Grant*

Proceedings with Parallel District Court Litigation, 5 (June 21, 2022) (“Guidance Memo”)).¹ The compelling-merits standard is higher than the reasonable-likelihood standard for institution. *CommScope*, Paper 23 at 3 (citing Guidance Memo 4–5; *OpenSky Indus., LLC v. VLSI Tech. LLC*, IPR2021-01064, Paper 102 at 49–50 (PTAB Oct. 4, 2022) (precedential)).

For the reasons discussed below, the Petition presents compelling evidence of unpatentability for all challenged claims. Thus, we institute an *inter partes* review.

A. Real Parties-in-Interest

Petitioner identifies Ericsson Inc., Telefonaktiebolaget LM Ericsson, and Nokia of America Corporation as the real parties-in-interest. Pet. 73. Petitioner also identifies T-Mobile USA, Inc., and Cellco Partnership d/b/a Verizon Wireless as “potential real parties in interest” because “one or both of the Petitioners have intervened in the Related Matters identified below due to their use of Petitioners’ products being accused of infringement.” *Id.* at 73 n.8, 74. Patent Owner identifies itself, Active Wireless Technologies LLC, as the real party-in-interest. Paper 5, 1.

B. Related Matters

The parties identify as related matters the following lawsuits involving the ’443 patent (and other patents): *Active Wireless Technologies LLC v. T-Mobile USA, Inc., et al.*, Case No. 2:23-cv-00261-JRG (E.D. Tex.) (“the Related Litigation”) and *Active Wireless Technologies LLC v. Verizon*

¹ https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf

Communications, Inc., et al., Case No. 2:23-cv-00620-JRG (E.D. Tex.).²
Pet. 73; Paper 5, 2.

C. The '443 Patent

The '443 patent is titled “Physical Uplink Control Channel (PUCCH) Format Adaptation for 5th Generation (5G) New Radio (NR).” Ex. 1001, code (54). The '443 patent issued from an application filed June 14, 2018. *Id.* at code (22). The '443 patent further claims priority to a PCT application filed on June 13, 2018 and to a provisional application filed on June 15, 2017. *Id.* at codes (60), (63).

According to the '443 patent, “[a]s wireless communication devices have advanced, improvements in communication capacity, speed, flexibility, and/or efficiency have been sought.” Ex. 1001, 1:34–36. The '443 patent identifies the problem that the communication structure used by wireless communication devices to communicate with one or more devices “may offer only limited flexibility and/or efficiency.” *Id.* at 1:39–43. The '443 patent asserts that its systems and methods “improve communication flexibility and/or efficiency.” *Id.* at 1:43–45.

A brief discussion of cellular technology helps to explain the nature of the devices recited in the challenged claims. As Petitioner’s declarant, Dr. Mahon, explains, a wireless cellular network is a “radio network distributed over land areas called cells” in which “[e]ach cell is served by at least one

² Because the Docket Control Order for Case No. 2:23-cv-00620 is not of record, and because the parties assert that the earliest scheduled trial date is for Case No. 2:23-cv-00261, we focus our *Fintiv* analysis on Case No. 2:23-cv-00261. *See infra* § II.

fixed-location transceiver, referred to as a base station (‘BS’).”³ Ex. 1003

¶ 196. These base stations “enable[] a large number of user equipment (‘UE’), such as cell phones, to communicate with each other anywhere in the network via the BS.” *Id.*

Base stations can transmit blocks of data in transport blocks (TBs). *Id.* ¶ 198. TBs can be “broken up into smaller units of data called code block groups.” *Id.* ¶ 199. Transmissions of TBs “can be either ‘common,’ such that they are meant to be received by all UEs in the cell or ‘user-specific,’ such that they are meant only for a particular UE within the cell.” *Id.* ¶ 203. Transmissions meant for all UEs are referred to as occurring in “common search space (‘CSS’)” while transmissions intended for a particular UE are referred to as occurring in a “UE-specific search space (‘USS’).” *Id.* ¶ 203.

When information is transmitted between BS and UE, the UE may send an acknowledgement indicating receipt of the information. *Id.* ¶ 197. “If the acknowledgement indicates a successful transmission, then the processing continues, however, if the acknowledgement indicates a failed transmission, then the BS re-transmits the same block to the UE again.” *Id.* The ’443 discloses sending acknowledgments of successful transmissions, referred to as hybrid-ARQ acknowledgments (HARQ-ACK). *Id.* ¶ 205.

The ’443 patent discloses that HARQ-ACK feedback may be determined by the space in which a transmission occurs. “If a PDSCH is scheduled in common search space (CSS) . . . , the UE **102** may report only one bit per TB or per PDSCH on a PUCCH format.” Ex. 1001, 21:20–24.

³ The ’443 patent also uses the abbreviation “gNB” to refer to base stations. Ex. 1001, 2:22–27. For convenience, we do the same.

Conversely, “[i]f the PDSCH is scheduled in UE-specific search space (USS), the UE **102** may report HARQ-ACK bits for at least all transmitted CBGs [code block groups].” *Id.* at 21:24–27.

D. Challenged Claims

The ’443 patent includes 5 claims, all of which are challenged here. Claim 3 is illustrative of the subject matter of the challenged claims and is reproduced below.⁴

3. **[Preamble]** A base station (gNB), comprising:
 [3.1] sending circuitry configured to send a physical downlink shared channel (PDSCH) that includes code block groups (CBGs) of a transport block; and
 [3.2] receiving circuitry configured to receive CBG based HARQ-ACK, wherein
 [3.3] for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block,
 [3.4] for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs.

Ex. 1001, 23:36–24:11 (bracketing added for reference purposes).

E. Asserted Grounds of Unpatentability

Petitioner asserts that claims 1–5 would have been unpatentable on the following grounds:

⁴ Claim 1 is similar to claim 3, but is directed to the user equipment rather than to the base station. The parties focus their arguments on claim 3. Accordingly, we do the same.

Claim(s) Challenged	35 U.S.C. § ⁵	Reference(s)/Basis
1–5	103	Wang ⁶
1–5	103	Yang ⁷

Petitioner relies on the declaration of Dr. Mark P. Mahon (Ex. 1003) among other evidence.

II. EXERCISE OF DISCRETION

Institution of an *inter partes* review is discretionary. *See* 35 U.S.C. § 314(a) (authorizing institution of an *inter partes* review under particular circumstances, but not requiring institution under any circumstances); *Cuozzo Speed Techs., LLC v. Lee*, 579 U.S. 261, 273 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018).

In the Preliminary Response, Patent Owner contends that we should exercise our discretion to deny the Petition because the Related Litigation will likely be completed months before a Final Written Decision in this proceeding. Prelim. Resp. 21–29.

When determining whether to exercise discretion to deny institution in view of a parallel proceeding, we consider the following factors:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;

⁵ The Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284, 285–88 (2011), revised 35 U.S.C. §§ 102, 103 effective March 16, 2013. The earliest date to which ’443 patent claims priority is June 15, 2017. Ex. 1001 (60). Because that date falls after the effective date of the applicable AIA amendments, we apply the AIA versions of §§ 102 and 103 here.

⁶ Wang et al., U.S. Patent No. 11,206,108 B2, issued Dec. 21, 2021 (Ex. 1004, “Wang”).

⁷ Yang et al., U.S. Patent No. 11,012,221 B2, issued May 18, 2021 (Ex. 1005, “Yang”).

2. proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board’s exercise of discretion, including the merits.

Apple Inc. v. Fintiv, Inc., IPR2020-00019, Paper 11 at 5–6 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”). “These factors relate to whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding.” *Id.* In evaluating these factors, we “take[] a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review.” *Id.* at 6. We consider each of these factors below.

On June 21, 2022, the Director of the United States Patent and Trademark Office issued a Memorandum setting forth an “Interim Procedure for Discretionary Denials in AIA Post Grant Proceedings with Parallel District Court Litigation.” (“Guidance Memo”). The Guidance Memo explains that “to benefit the patent system and the public good, the PTAB will not rely on the *Fintiv* factors to discretionarily deny institution in view of parallel district court litigation where a petition presents compelling evidence of unpatentability.” *Id.* at 2. “Compelling, meritorious challenges are those in which the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” *Id.* at 4.

With these *Fintiv* factors and the Director’s guidance in mind, we consider the parties’ contentions.

In the analysis that follows, we first consider whether *Fintiv* factors 1–5 weigh in favor of exercising our discretion to deny institution. For the reasons discussed below, we conclude that *Fintiv* factor 1 is neutral, factors 2, 3, and 5 weigh in favor of denial, and factor 4 weighs marginally against discretionary denial. On balance the *Fintiv* factors weigh in favor of denying institution. Because the *Fintiv* factors favor denial of institution, we must also determine whether the Petition presents compelling merits. *See CommScope Techs. LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4 (PTAB Feb. 27, 2023) (precedential) (“In circumstances where . . . the Board’s analysis of *Fintiv* factors 1–5 favors denial of institution, the Board shall then assess compelling merits.”).

1. *Likelihood of a Stay (Factor 1)*

Fintiv factor 1 recognizes that a stay of litigation pending resolution of the PTAB trial allays concerns about inefficiency and duplication of efforts, which strongly weighs against exercising the authority to deny institution. *Fintiv*, Paper 11 at 6.

Petitioner argues that this factor is neutral, asserting that “no request for stay has been filed.” Pet. 70. Patent Owner asserts that “a motion for a stay by Petitioner has already been denied.” Prelim. Resp. 25–26 (citing Dkt. 68 in the Related Litigation). Both parties paint a somewhat incomplete picture of what has transpired in the Related Litigation with respect to a stay. In fact, Judge Gilstrap denied Petitioner’s Motion to Stay without prejudice on the basis that it was premature. Ex. 2003, 3. Judge Gilstrap’s decision expressly permits Petitioner leave to refile its Motion “within fourteen (14) days following the Board’s last institution decision.” *Id.* Accordingly, the possibility of a stay remains open.

Absent specific evidence, the Board, typically, “will not attempt to predict how the district court in the related district court litigation will proceed because the court may determine whether or not to stay any individual case . . . based on a variety of circumstances and facts beyond our control and to which the Board is not privy.” *Sand Revolution II LLC v. Cont’l Intermodal Grp.*, IPR2019-01393, Paper 24, 7 (PTAB June 16, 2020) (informative). We decline to speculate on how the court may rule on a motion for a stay should one be filed. Accordingly, this factor is neutral.

2. *Proximity of Trial Date to Projected Deadline (Factor 2)*

Fintiv factor 2 looks to the “proximity of the court’s trial date to the Board’s projected statutory deadline.” *Fintiv*, Paper 11 at 9. The Board’s projected statutory deadline for reaching a final written decision in this matter is in December of 2025. The earliest scheduled trial date in the Related Litigation is March 17, 2025. Ex. 2001, 1.⁸ Because the scheduled trial date substantially predates the expected date of our final written decision, this factor weighs in favor of denial. *See e.g., Fintiv*, Paper 15 at 13 (informative) (“Because the currently scheduled District Court trial is scheduled to begin two months before our deadline to reach a final decision, this factor weighs somewhat in favor of discretionary denial in this case.”); *Edward LifeSciences Corp. v. Evalve, Inc.*, IPR2019-01479, Paper 7 at 6–13 (PTAB Feb. 26, 2020) (denying institution where jury trial would conclude more than nine months before a final decision would be due); *Samsung Elecs. Am., Inc. v. Uniloc 2017 LLC*, IPR2019-01218, Paper 7 at 7–10 (PTAB Jan. 7, 2020) (denying institution where jury selection was scheduled

⁸ Neither party introduces evidence of current median time-to-trial statistics for the Eastern District of Texas.

for approximately six months before trial in the Board proceeding would conclude).

3. *Investment in the Parallel Proceeding (Factor 3)*

Fintiv factor 3 considers the “investment in the parallel proceeding by the court and parties,” including “the amount and type of work already completed in the parallel litigation by the court and the parties at the time of the institution decision.” *Fintiv*, Paper 11 at 9. For example, if, at the time of institution, the court in the parallel proceeding has issued “substantive orders related to the patent at issue in the petition” or “claim construction orders,” this favors denial. *Id.* at 9–10.

Petitioner asserts in its Petition that “the Related Litigations are in their early stages, and the investment in them has been minimal at this time.” Pet. 71. In addition, Petitioner asserts that it “diligently prepared this Petition and filed in advance of the statutory deadline, which weighs further against denying institution.” *Id.* Thus, according to Petitioner, “[f]actor 3 heavily favors institution.”

Patent Owner responds that “[t]he parties’ investment in the parallel proceeding weighs in favor of discretionary denial.” Prelim. Resp. 25. According to Patent Owner, the district court has already issued several orders, and “[d]iscovery is . . . well underway.” *Id.* Patent Owner, thus, asserts that “the parties’ and Court’s substantial investment in this proceeding weighs in favor of denial of institution.”

We agree with Patent Owner that the existing investment by the parties and the court in the Related Litigation has been substantial. Discovery in the Related Litigation has closed. Ex. 2001, 4 (Docket Control Order listing the deadline for completion of fact discovery as October 11 and the deadline for completion of expert discovery as December 4). In

addition, the deadline for filing dispositive motions and *Daubert* motions has passed. *Id.* (listing the deadline for filing such motions as December 9, 2024). Although work remains in the lead-up to trial before the district court, we find that this factor favors exercising our discretion to deny institution.

Petitioner’s argument that its diligence weighs in favor of institution is weak. Petitioner does not explain how it was diligent or even identify the time period during which it contends it was diligent. For example, Petitioner does not present argument or evidence on whether it was diligent from:

1) the date suit was filed against its customer, 2) the date it received notice of such suit, 3) the date it moved to intervene in the suit against its customer, 4) the date it received infringement contentions, or 5) some other date.

Absent argument or evidence supporting Petitioner’s diligence, we are not persuaded that filing the Petition “in advance of the statutory deadline” weighs against discretionary denial.

4. *Overlap of Issues (Factor 4)*

Fintiv factor 4 considers whether “the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding.” *Fintiv*, Paper 11 at 12. If the issues in the Petition overlap substantially with those raised in the parallel proceeding, “this fact has favored denial.” *Id.* “Conversely, if the petition includes materially different grounds, arguments, and/or evidence . . . this fact has tended to weigh against exercising discretion to deny institution.” *Id.* at 12–13.

Here, Petitioner stipulates that it “will not pursue invalidity against the Challenged Claims in the district court using the specific combination of prior art references set forth in the grounds herein for establishing

invalidity.” Pet. 72. Patent Owner asserts that the same claims are at issue here as in the Related Litigation and that institution would “duplicate effort” and be an “inefficient use of Board, party, and judicial resources.” Prelim. Resp. 23. Patent Owner also asserts that institution would “raise[] the possibility of conflicting decisions.” *Id.* Additionally, Patent Owner asserts that an IPR, if instituted, “would only cover 2 out of at least 7 combinations of obviousness that Petitioner has raised in the District Court Litigation, and [would] not include Petitioner’s challenges under § 101, § 102, or § 112.” *Id.* at 26.

The Board’s informative decision in *Sand Revolution II, LLC v. Continental Intermodal Group – Trucking LLC* expressed skepticism that stipulations like that submitted here achieve the goals of avoiding duplication and inconsistent decisions:

Petitioner *could have stipulated* that it would not pursue any ground raised or that *could have been reasonably raised* in an IPR, i.e., any ground that could be raised under §§ 102 or 103 on the basis of prior art patents or printed publications. *A broader stipulation of that nature, not at issue here, might better address concerns regarding duplicative efforts and potentially conflicting decisions in a much more substantial way.* Likewise, such a stipulation might help ensure that an IPR functions as a true alternative to litigation in relation to grounds that could be at issue in an IPR. Further still, Petitioner could have expressly waived in the district court any overlapping patentability/invalidity defenses. Doing so might have tipped this factor more conclusively in its favor.

IPR2019-01393, Paper 24 at 12 n.5 (PTAB June 16, 2020) (informative) (emphasis added). The Board in *Sand Revolution* accorded a stipulation not containing the “could have reasonably raised” provision “marginal[]” weight. *Id.* at 12.

Petitioner’s stipulation does reduce somewhat the overlap relating to the challenge presented in the Petition, but not as fully as would a *Sotera*-type stipulation. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18–19 (PTAB Dec. 1, 2020) (precedential) (addressing a stipulation to not pursue in court any grounds raised or that reasonably could have been raised in the IPR); Guidance Memo 7–8 (explaining that institution will not be discretionarily denied due to parallel litigation where a *Sotera*-type stipulation is made). Accordingly, consistent with the decision in *Sand Revolution*, we find that Petitioner’s stipulation weighs only marginally against discretionary denial. IPR2019-01393, Paper 24 at 12 (determining that stipulation similar to that here weighed “marginally” against discretionary denial).

Overall, we find that this factor weighs marginally against exercising our discretion to deny institution.

5. *Identity of Parties (Factor 5)*

Petitioner is an intervenor/defendant in the Related Litigation. Pet. 72. To the extent that trial in the district court may precede the deadline for a final written decision in this proceeding, this factor favors exercising our discretion to deny institution. *Huawei Tech. Co. v. WSOU Inv., LLC*, IPR2021-00225, Paper 11 at 14 (PTAB June 14, 2021) (finding that “this factor favors denial if trial precedes the Board’s Final Written Decision and favors institution if the opposite is true”) (internal quotation marks omitted); *Google LLC v. Parus Holdings, Inc.*, IPR2020-00846, Paper 9 at 21 (PTAB Oct. 21, 2020) (“Here, . . . Petitioner is the defendant in the parallel proceeding. This fact could weigh either in favor of, or against, exercising discretion to deny institution, depending on which tribunal was likely to address the challenged patent first.”). As discussed *supra* § II.B.2, trial in

the district court is likely to precede our final written decision. Accordingly, this factor weighs in favor of exercising our discretion to deny institution.

6. *Other Circumstances Including the Merits (Factor 6)*

We take “a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review” when evaluating these factors. *Fintiv*, Paper 11 at 6. We have considered the circumstances and facts before us in view of *Fintiv* factors 1–5. As discussed above, factor 1 is neutral, factors 2, 3, and 5 weigh in favor of discretionary denial of institution, and factor 4 weighs marginally against discretionary denial. On balance, we conclude that the evidence of record on factors 1–5 favors exercising our discretion to deny institution of an *inter partes* review.

Following *CommScope*, where, as here, our analysis of the first five *Fintiv* factors favors denial of institution, we address the merits of the Petition to determine whether, on this preliminary record, the merits are compelling. *CommScope Technologies LLC v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 at 4–5; Guidance Memo 3–5.

III. COMPELLING MERITS ANALYSIS

A. *Legal Principles*

“In an [*inter partes* review], the petitioner has the burden from the onset to show with particularity why the patent it challenges is unpatentable.” *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3)).

A claim is unpatentable under 35 U.S.C. § 103 “if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to

which the claimed invention pertains.” 35 U.S.C. § 103; *see 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) objective indicia of nonobviousness when presented. *Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966). Moreover, “[a]n obviousness determination requires finding both that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.” *CRFD Rsch., Inc. v. Matal*, 876 F.3d 1330, 1340 (Fed. Cir. 2017) (internal quotation marks and citation omitted).

“Compelling, meritorious challenges are those in which the evidence, if unrebutted at trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” Guidance Memo 4. Compelling, meritorious challenges have a more than reasonable likelihood of showing that a claim is unpatentable by a preponderance of the evidence. *OpenSky*, Paper 102 at 49–50. “A challenge can only ‘plainly lead to a conclusion that one or more claims are unpatentable’ . . . if it is highly likely that the petitioner would prevail with respect to at least one challenged claim.” *Id.* at 49.

B. Level of Ordinary Skill in the Art

Petitioner contends that a person of ordinary skill in the art (“POSA” or “POSITA”) would have been “familiar with wireless communications networks, equipment, and integrated circuit chips, and would have had at least a working knowledge of communication protocols used in LTE and 5G

radio access networks (“RAN”).” Pet. 9. According to Petitioner, a POSA would have “at least a Bachelor’s degree in Electrical Engineering or an equivalent field, and at least two years of work experience in design, development, and/or testing wireless telecommunication systems” as well as “familiarity with the wireless standards and protocols related to data transmission and network management.” *Id.* at 9–10. At this stage in the proceeding, Patent Owner does not contest Petitioner’s definition of the POSA. Prelim. Resp. 7 (“For purposes of this Preliminary Response only, Patent Owner utilizes Petitioner’s proposed level of skill in the art.”).

Petitioner’s description of a POSA is consistent with the subject matter of the ’443 patent and with the prior art of record. Accordingly, we apply it for purposes of this decision, with the exception of the qualifier “at least” which expands the ranges of education and experience indefinitely with no upper bound. *See Okajima v. Bourdeau*, 261 F.3d 1350, 1355 (Fed. Cir. 2001); *In re GPAC Inc.*, 57 F.3d 1573, 1579 (Fed. Cir. 1995); *In re Oelrich*, 579 F.2d 86, 91 (CCPA 1978).

C. Claim Construction

We interpret a claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b) (2020). Under this standard, we construe the claim “in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.*

Petitioner proposes that, for purposes of this proceeding, “each claim term be given its plain and ordinary meaning.” Pet. 9. At this stage in the proceeding, Patent Owner does not contest or identify any claim terms as

needing construction. Prelim. Resp. 7 (“For purposes of this Preliminary Response, Patent Owner agrees with Petitioner that ‘each claim term be given its plain and ordinary meaning.’”).

Absent any apparent dispute between the parties as to how the claims should be construed, we do not find it necessary to construe the claims at this stage of the proceeding. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co. Ltd.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (“[W]e need only construe terms ‘that are in controversy, and only to the extent necessary to resolve the controversy’” (quoting *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))); *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011) (“[C]laim terms need only be construed ‘to the extent necessary to resolve the controversy’”).

D. Overview of the Asserted Prior Art

1. *Wang (Ex. 1004)*

Wang is a U.S. patent that issued on December 21, 2021 from an application filed on January 3, 2018. Ex. 1004, codes (10) and (22). Wang claims priority from Chinese Application No. 201710288177.X, filed on April 27, 2017. *Id.* at code (30). Petitioner contends that Wang is prior art under 35 U.S.C. § 102(a)(2). Pet. 19.

Wang discloses “a method and device for transmitting data.” Ex. 1004, 3:6–10. In Wang’s method user equipment (UE) detects a “physical downlink control channel (PDCCH)” and determines a “method for dividing code blocks” (CBs) and for “rate matching of a physical downlink shared channel” (PDSCH). *Id.* at 3:11–21; *see also id.* at 7:43–45 (disclosing that the UE can determine transmission block size (TBS) and divide it into CBs and code block groups (CBGs)). The UE “receiv[es] the PDSCH according

to the PDCCH, . . . generat[es] . . . HARQ-ACK information according to the PDSCH, and transmit[s] the HARQ-ACK information” to a base station. *Id.* at 3:11–21; *see also id.* at 7:57 (disclosing that the “UE generates HARQ-ACK information based on the received PDSCH and transmits the HARQ-ACK information”).

According to Wang, “the HARQ-ACK information is determined to be . . . single bit HARQ-ACK information or . . . multi-bit HARQ-ACK information according to one or more . . . parameters” including “downlink control channel search space.” *Id.* at 3:57–65. In one of Wang’s embodiments, “the single bit HARQ-ACK feedback is adopted by the DCI in the common search space (CSS) fixedly while the multi-bit HARQ-ACK is adopted by the DCI in a user-specific search space (USS) fixedly.” *Id.* at 12:50–57. Wang further teaches that in this embodiment, and where the TB is divided into CBGs, “the UE may feed back the HARQ-ACK information for each CBG separately.” *Id.* at 12:16–19.

2. *Yang (Ex. 1005)*

Yang is a U.S. patent that issued on May 18, 2021 from an application filed on March 8, 2018. Ex. 1004, codes (10) and (22). Yang claims priority from a provisional application, filed on May 3, 2017. *Id.* at code (60). Petitioner contends that Yang is prior art under 35 U.S.C. § 102(a)(2). Pet. 19–20.

Yang discloses a “wireless communication system, and more specifically, methods and devices for transmitting/receiving signals.” Ex. 1005, 1:8–10. In one embodiment, Yang’s user equipment receives an initial transmission of data from a base station on a PDSCH. *Id.* at 21:21–

22. The data can comprise a “transport block include[ing] a plurality of code blocks,” which can be “grouped into one or more code block groups.” *Id.* at 21:22–25. Upon receipt of the initial transmission, “the UE can feed back CBG based (code block group-based) A/N information⁹ on the data to the BS [S1606], and the BS can perform data retransmission based on the code block group [S1608].” *Id.* at 21:29–32. Yang explains that “the A/N information includes a plurality of A/N bits for the data, and each of the A/N bits can indicate each A/N response, which is generated in unit code block group, for the data.” *Id.* at 21:32–37.

In another embodiment, Yang discloses that HARQ-ACK feedback can be based on whether the transmission is scheduled through common search space (CSS) or through UE-specific search space (USS).

Specifically, Yang discloses:

Hence, for DL/UL data transmission scheduled through DCI (or TM-dedicated DCI format set/used for specific TM only) transmission based not on CSS but on USS, a CBG-unit retransmission scheduling and per-CBG A/N feedback configuration operation is applicable/configurable. On the other hand, for DL/UL data (and/or Msg3/4) transmission scheduled through CSS based DCI (or TM common DCI format) transmission, a TB-unit retransmission scheduling and per-TB (TB level) A/N feedback operation is applicable/configurable (i.e., TB-level A/N feedback is configured).

Id. at 37:63–38:7.

⁹ Yang defines A/N to mean “HARQ-ACK response” and includes “ACK, NACK, or DTX,” with DTX referring to “a case of missing a PDCCH.” Ex. 1005, 17:10–14.

E. Analysis

The '433 patent has five claims, four of which are independent. With respect to the four independent claims: Claim 3 recites a “base station”; claim 1 recites the “user equipment” analog of the base station recited in claim 3; claim 4 recites a method claim analog of the user equipment of claim 1; and claim 5 recites a method claim analog of the base station of claim 3. Ex. 1001, 23:15–24:37. Petitioner focuses its proof, and Patent Owner focuses its argument, on claim 3. Pet. 36–42, and 63–69 (relying on evidence for claim 3 for showing with respect to independent claims 1, 4, and 5); Prelim. Resp. 20–21 (relying on arguments for claim 3 in arguing that the Petition should be denied). Accordingly, we focus our compelling merits analysis on claim 3.

1. Ground 1: Obviousness over Wang

Petitioner asserts that claims 1–5 are unpatentable as obvious over Wang. Pet. 20–42. We provided an overview of Wang above. Below we provide an element-by-element analysis of Petitioner’s obviousness showing for claim 3. We then turn to claim 1, 2, 4, and 5. After considering the evidence supporting Petitioner’s obviousness showing, and Patent Owner’s arguments and evidence as to why Petitioner’s obviousness showing is deficient, we consider whether the totality of the evidence rises to the level of compelling merits.

For the reasons discussed below, we determine that Petitioner has established a high likelihood of prevailing on its assertion that at least one of the challenged claims are unpatentable based on Ground 1 and that Petitioner’s showing, in fact, rises to the level of “compelling merits” according to the Office’s current guidance and Board precedents.

a) Preamble (claim 3)

The preamble of claim 3 recites a “base station (gNB).” Ex. 1001, 23:36. Petitioner contends that Wang discloses the subject matter recited in the preamble of claim 3. Pet. 23–25. At this stage in the proceeding, Patent Owner does not dispute that Wang discloses a base station. *See generally* Prelim. Resp. On this preliminary record, the evidence supports that Wang discloses a base station.¹⁰ *See, e.g.*, Pet. 23–25; Ex. 1004, 5:60–66 (explaining that “downlink transmission” in Wang’s “wireless communication system” refers to “transmitting a signal from a base station to UE” and that in such system “the base station transmits downlink data in a physical downlink shared channel (PDSCH), or transmits downlink control information in a downlink control channel.”); Ex. 1007, 9 (Wang Foreign Priority Application making similar disclosure to that in Wang).

b) Limitation 3.1

Claim limitation 3.1 requires that the base station comprise “sending circuitry configured to send a physical downlink shared channel (PDSCH) that includes code block groups (CBGs) of a transport block.” Ex. 1001, 23:37–39. Petitioner contends that Wang discloses this limitation. Pet. 25–28. At this stage in the proceeding, Patent Owner does not dispute that Wang discloses sending circuitry configured as claimed. *See generally* Prelim. Resp. On this preliminary record, the evidence supports that Wang discloses a base station comprising the claimed sending circuitry. *See, e.g.*, Pet. 25–28; Ex. 1004, 5:60–66 (explaining that “downlink transmission” in

¹⁰ Because we determine that Petitioner’s showing that Wang discloses a base station is sufficient to support institution, we need not determine here whether the preamble limits the claims. *Nidec*, 868 F.3d at 1017.

Wang’s “wireless communication system” refers to “transmitting a signal from a base station to UE” and that in such system “the base station transmits downlink data in a physical downlink shared channel (PDSCH)”, 6:5–6 (“[t]he base station may dynamically schedule the PDSCH transmission”), 23:23–24 (“[t]he base station transmits a TB, which is divided into 4 CBGs”), 4:61–65 (explaining that the PDSCH comprises CBs and CBGs), 7:46–53 (explaining that the “TB may be divided into multiple CBs and then the multiple CBs are grouped into CBGs”), Fig. 9 (illustrating TBs broken into CBGs); Ex. 1003 ¶ 249 (explaining that the POSA would understand that “a base station that transmits data over a PDSCH would include sending circuitry to effectuate that downlink transmission”); Ex. 1007, 9, 15, 17, 42, Fig. 9 (Wang Foreign Priority Application making similar disclosures to those in Wang).

c) Limitation 3.2

Claim limitation 3.2 requires that the base station comprise “receiving circuitry configured to receive CBG based HARQ-ACK.” Ex. 1001, 24:1–2. Petitioner contends that Wang discloses this limitation. Pet. 29–32. At this stage in the proceeding, Patent Owner does not dispute that Wang discloses a base station comprising the claimed receiving circuitry. *See generally* Prelim. Resp. On this preliminary record, the evidence supports that Wang discloses receiving circuitry configured as claimed. *See, e.g.*, Pet. 23–25; Ex. 1004, 38:35–43 (disclosing an embodiment in which Wang’s base station comprises a “processor configured to execute the stored instructions to . . . receive, from the terminal, HARQ-ACK information generated according to the PDSCH”), 5:37–46 (explaining that Wang’s UE generates HARQ-ACK information according to the PDSCH and transmits it), 7:57–

59 (“[t]he UE generates HARQ-ACK information based on the received PDSCH and transmits the HARQ-ACK information”); 12:18–19 (“the UE may feed back the HARQ-ACK information for each CBG separately”); Ex. 1004 ¶¶ 270–271 (explaining that the “entire purpose of a UE is to communi[c]ate with a base station” and that the POSA would understand Wang’s base station to include “receiving circuitry configured to receive CBG based HARQ-ACK” and Wang’s UE to include “transmitting circuitry configured to transmit CBG based HARQ-ACK”); Ex. 1007, 12, 16, 18, 25 (Wang Foreign Priority Application making similar disclosures to those in Wang).

d) Limitation 3.3

Claim limitation 3.3 requires that, “for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block.” Ex. 1001, 24:3–6. Petitioner contends that Wang discloses and/or renders this claim element obvious. Pet. 32–34. Specifically, Petitioner points to Wang’s disclosures that HARQ-ACK can be single or multi-bit, that the determination of whether it is single or multi-bit “is determined . . . according to” among other parameters “downlink control channel search space,” and that “the UE generates HARQ-ACK information based on the received PDSCH.” Ex. 1004, 3:57–65, 7:57–59 (cited at Pet. 32). Petitioner also points to Wang’s disclosure that “it is a default operation to feed back single bit HARQ-ACK information for one TB” and that “the single bit HARQ-ACK feedback method is adopted by the DCI in the common search space (CSS) fixedly while the multi-bit HARQ-ACK feedback method is adopted by the DCI in a user-specific search space

(USS) fixedly.” *Id.* at 12:35–36, 12:50–57 (cited at Pet. 32–33). Petitioner points to similar disclosures in the Wang Foreign Priority Application. Pet. 33 (citing Ex. 1007, 13, 18).

In addition, Petitioner asserts that, to the extent Wang does not disclose limitation 3.3, it would have been obvious over Wang and the POSA’s knowledge of the art. According to Petitioner, and Petitioner’s declarant, Dr. Mahon, it was “well known . . . that TBs could be . . . subdivided in CBs or CBGs and that UEs could transmit HARQ-ACK bits on either a TB or CBG basis to improve the efficiency of the system and potentially prevent the need for retransmission of an entire TB whenever a NACK signal is received.” Pet. 33–34; Ex. 1003 ¶ 281. Petitioner asserts that it was also known that it was desirable to transmit one HARQ-ACK per TB in some instances and one HARQ-ACK bit per CBG in other instances. *Id.* Petitioner explains that there are a limited number of ways to “distinguish between one HARQ-ACK transmission method and another,” and therefore the POSA would “immediately recognize that one such distinguishing characteristic to devise such a system around is search space configuration, such that one HARQ-ACK bit is transmitted per TB in one search space configuration (*e.g.*, CSS), while one HARQ-ACK bit is transmitted per CBG in another search space configuration.” *Id.*

Patent Owner argues that the citations to Wang in the Petition are “divorced from whether the HARQ-ACK corresponds to a PDSCH scheduled in a CSS.” Prelim. Resp. 10. According to Patent Owner,

each of the Petition’s citations to Wang, the Wang Foreign Priority Application, or the alleged understanding of the state of the art disclosing whether or not there is a possibility of transmitting one HARQ-ACK bit or multiple HARQ-ACK bits per CBG is inapposite as to whether the singular bit is

transmitted only in the instance where a PDSCH is scheduled in a CSS, as the claim recites.

Id. at 13.

As an initial matter, the parties appear to agree that the requirement that the PDSCH be “scheduled in a common search space (CSS)” means that a “PDCCH transmits in a search space and carries control information to schedule / allocate the PDSCH.” Prelim. Reply. 1 (identifying this as the proper construction and arguing that Patent Owner’s arguments are not grounded in this construction); Prelim Sur-reply 1 (agreeing with this claim construction and asserting that Petitioner attributes to it a “strawman interpretation of the claim limitation” that it did not follow); Ex. 1013 ¶¶ 224–225 (Patent Owner’s expert report in the Related Litigation, stating “a PDCCH monitored in a search space set (CSS/USS) carrying control information such as scheduling decisions for PDSCH meets the claim limitation of [limitation 3.3]”).

The parties also appear to agree that Wang discloses DCI carried in a CSS that schedules the feedback method where the HARQ-ACK occurs. Pet. 32–33 (citing Wang’s disclosure that “the HARQ-ACK feedback method is adopted by the DCI in the common search space (CSS) fixedly”); Prelim. Resp. 11 (conceding that Wang discloses “a single bit HARQ-ACK feedback method adopted by the DCI in the common search space”); Ex. 1004, 12:48–57. Thus, the parties appear to agree that there is at least one embodiment that provides HARQ-ACK feedback in the CSS.

This leaves open the question of whether Wang’s disclosure of a method of differentiating HARQ-ACK feedback based on search space—with single-bit feedback adopted by the DCI in CSS and multi-bit feedback adopted by the DCI in USS (Ex. 1004, 12:48–57)—corresponds to a

PDSCH. Patent Owner contends that it does not. *See* Prelim. Sur-reply 3 (arguing that “Petitioner’s citations . . . do not describe whether the disclosed DCI or DL data transmitted in a CSS or USS necessarily has a relation to the claimed PDSCH (*e.g.*, that the DCI was transmitted through a PDCCH that scheduled the PDSCH in the disclosed CSS/USS).”). The preliminary record supports that it does.

Wang’s Figure 3 depicts a three-step method. In the first step, “[a] UE detects a PDCCH on a configured control resource set.” Ex. 1004, 7:20–21. In the second step, “[t]he UE analyzes the detected PDCCH, determines a method for dividing code blocks (CBs) and a method for PDSCH RE mapping, and receives the PDSCH accordingly.” *Id.* at 7:28–31. In this second step, “[t]he UE may determine a TBS and divide CBs and/or CB groups (CBG) accordingly, depending on a DCI carried by the received PDCCH, so that the data channel may be decoded and the like.” *Id.* at 7:43–46. In the third step, “[t]he UE generates HARQ-ACK information based on the received PDSCH and transmits the HARQ-ACK information.” *Id.* at 7:57–59. Thus, Wang discloses an embodiment in which the HARQ-ACK information corresponds to the PDSCH. *See also id.* at 15:55–56 (“The UE may feed back the HARQ-ACK information of the PDSCH . . .”). Absent argument or evidence that the method of Wang’s Figure 3 does not extend to Wang’s disclosure of differentiating HARQ-ACK feedback based on search space (using a single bit HARQ-ACK feedback method in CSS and a multi-bit HARQ-ACK feedback method in USS), the preliminary record supports that Wang’s method of single bit HARQ-ACK feedback (Ex. 1004, 12:48–57) corresponds to a PDSCH.

e) Limitation 3.4

Claim limitation 3.4 requires that, “for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs.” Ex. 1001, 24:7–11. Petitioner contends that Wang discloses and/or renders this claim element obvious. Pet. 34–36. For this limitation, Petitioner relies on the same disclosures in Wang that were discussed in connection with limitation 3.3, with the only difference being that it focuses on the multi-bit rather than the single-bit aspect of Wang’s HARQ-ACK feedback method. *Id.* at 35. Patent Owner’s arguments with respect to this limitation are similar to its arguments for limitation 3.3 and we find them unavailing on this preliminary record for the reasons discussed above.

f) Conclusion for claim 3

For the reasons discussed above, the preliminary record supports that Wang teaches or suggests each of the elements of claim 3. Further, we find that “the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” Guidance Memo 4. Accordingly, for the reasons set forth above, we determine that the Petition presents a compelling meritorious challenge with respect to claim 3.

g) Claims 1, 2, 4, and 5

Petitioner contends that claims 1, 2, 4, and 5 are taught or suggested in the prior art, and that the skilled artisan would have predictably modified the prior art to the extent needed to arrive at the claimed subject matter with a reasonable expectation of success. Pet. 36–42. Petitioner’s contentions are

supported by citation to the prior art and declarant testimony. *Id.* Patent Owner does not differentiate its arguments by claim, relying on the same arguments for all of the claims. Prelim. Resp. 20–21. For the reasons discussed above, on this preliminary record, we find Patent Owner’s arguments unavailing.

h) Conclusion on compelling merits for Ground 1

For the reasons set forth above, we determine that Ground 1 of the Petition presents a compelling meritorious challenge. That is, “the evidence, if unrebutted in trial, would plainly lead to a conclusion that one or more claims are unpatentable by a preponderance of the evidence.” Guidance Memo 4. As the Director explains in *OpenSky*, however, this finding “should not be taken as a signal to the ultimate conclusion after trial” because “all relevant evidence likely will not have been adduced at the point of institution [and] trial should produce additional evidence that may support a determination in the Final Written Decision that unpatentability has not been adequately proven.” *OpenSky*, IPR2021-01064, Paper 102 at 49–50.

2. Ground 2: Obviousness Over Yang

Petitioner asserts that claims 1–5 are unpatentable as obvious over Yang. Pet. 42–69. We provided an overview of Yang above. As with Ground 1, the parties focus their arguments and evidence on claim 3. Accordingly, we do the same. Below we provide an element-by-element analysis of Petitioner’s obviousness showing for claim 3. We then turn to claim 1, 2, 4, and 5. Because we have already determined that Ground 1 presents a compelling meritorious challenge, we need not determine whether Ground 2 presents such a challenge.

a) Preamble (claim 3)

The preamble of claim 3 recites a “base station (gNB).” Ex. 1001, 23:36. Petitioner contends that Yang discloses the subject matter recited in the preamble of claim 3. Pet. 45–47. At this stage in the proceeding, Patent Owner does not dispute that Yang discloses a base station. *See generally* Prelim. Resp. On this preliminary record, the evidence tends to support that Yang discloses a base station.¹¹ *See, e.g.*, Pet. 23–25; Ex. 1005, 1:61–66 (“the base station including a radio frequency (RF) module and a processor configured to transmit information on a number M of code block groups defined for one transport block to a user equipment”), 2:42–3:8 (“user equipment . . . including a radio frequency (RF) module and a processor configured to receive information on a number M of code block groups defined for one transport block from a base station”), Fig. 18 (illustrating a base station communicating with user equipment); Ex. 1009, 38 (Wang provisional application, disclosing that “[i]n one example, an eNB may transmit signals to a UE or a UE may transmit signals to an eNB”).

b) Limitation 3.1

Claim limitation 3.1 requires that the base station comprise “sending circuitry configured to send a physical downlink shared channel (PDSCH) that includes code block groups (CBGs) of a transport block.” Ex. 1001, 23:37–39. Petitioner contends that Yang discloses this limitation. Pet. 47–51. At this stage in the proceeding, Patent Owner does not dispute that Yang discloses sending circuitry configured as claimed. *See generally* Prelim.

¹¹ Because we determine that Petitioner’s showing that Yang discloses a base station is sufficient to support institution, we need not determine here whether the preamble limits the claims. *Nidec*, 868 F.3d at 1017.

Resp. On this preliminary record, the evidence tends to support that Yang discloses a base station comprising the claimed sending circuitry. *See, e.g.*, Pet. 47–51; Ex. 1005, 21:21–25 (“the UE can receive initial transmission of data from the BS (on PDSCH)” which can include a transport block comprised of code block and code block groups), 1:61–2:10 (explaining that Tang’s UE receives a “plurality of code blocks from the base station through a physical layer channel”), 2:59–67 (explaining that that the base station includes “a processor configured to . . . transmit a first transport block including a plurality of code blocks to the user equipment through a physical layer channel”), 4:45–46 (explaining that the UE may acquire specific system information by receiving “a physical downlink shared channel (PDSCH)”), Fig. 16 (illustrating a BS transmitting a TB comprised of CBs and CBGs to UE), Fig. 18 (illustrating transmitting and receiving circuitry for BS and UE, respectively); Ex. 1003 ¶ 329 (Dr. Mahon explaining that the POSA would understand that “a base station that transmits data over a PDSCH would include sending circuitry to effectuate that downlink transmission”); Ex. 1009, 6, 66 (Yang provisional application making similar disclosures to those in Yang).

c) Limitation 3.2

Claim limitation 3.2 requires that the base station comprise “receiving circuitry configured to receive CBG based HARQ-ACK.” Ex. 1001, 24:1–2. Petitioner contends that Yang discloses this limitation. Pet. 51–55. At this stage in the proceeding, Patent Owner does not dispute that Yang discloses a base station comprising the claimed receiving circuitry. *See generally* Prelim. Resp. On this preliminary record, the evidence tends to support that Yang discloses a base station. *See, e.g.*, Pet. 51–55; Ex. 1005, 21:29–31

(“the UE can feed back CBG-based (code block group-based) A/N information on the data to the BS”), 2:59–3:8 (explaining that the base station includes “a processor configured to . . . receive [a] Hybrid ARQ Acknowledgement (HARQ-ACK) payload . . . [that] includes a plurality of HARQ-ACK bits corresponding to M code block groups for the first transport block”), 1:61–2:10 (explaining that Tang’s UE transmits a HARQ-ACK payload that “includ[es] a plurality of HARQ-ACK bits corresponding to M code block groups for the first transport block”), 2:59–3:8 (“transmit a first transport block including a plurality of code blocks to the user equipment through a physical layer channel”), Fig. 16 (illustrating a BS receiving “CBG-based A/N feedback”), Fig. 18 (illustrating transmitting and receiving circuitry for BS and UE, respectively); Ex. 1003 ¶ 345 (Dr. Mahon explaining that the POSA would understand that “a base station that receives HARQ-ACK information would include sending circuitry to effectuate that reception”); Ex. 1009, 19, 66 (Yang provisional application making similar disclosures to those in Yang).

d) Limitation 3.3

Claim limitation 3.3 requires that, “for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a common search space (CSS), the receiving circuitry is configured to receive one HARQ-ACK bit for the transport block.” Ex. 1001, 24:3–6. Petitioner contends that Yang discloses and/or renders this claim element obvious. Pet. 55–60.

Specifically, Petitioner points to Yang’s disclosure of a method of “configuring/transmitting HARQ-ACK feedback in [a] unit of CB/CBG.” Ex. 1005, 16:55–64 (cited at Pet. 55–56). Petitioner also points to Yang’s disclosure that “the UE can receive initial transmission of data from the BS

(on PDSCH) [S1604]” and then “the UE can feed back CBG-based (code block group-based) A/N information on the data to the BS [S1606].” *Id.* at 21:21–32 (cited at Pet. 56). According to Petitioner, the CBG-based HARQ-ACK feedback that the UE feeds back to the BS corresponds directly to the initial transmission of data that the UE receives from the BS. Pet. 55–56 (citing Ex. 1005, Fig. 16; Ex. 1003 ¶ 354). Finally, Petitioner asserts that Yang discloses “differentiating CBG based HARQ-ACK feedback corresponding to the search space that the PDSCH is scheduled in.” *Id.* at 57–58. As support, Petitioner cites Yang’s disclosure of providing “per-CGB A/N feedback configuration” for transmissions scheduled in USS and providing “per-TB (TB level) A/N feedback” for transmissions scheduled through CSS. Ex. 1005, 37:63–38:6 (cited at Pet. 58); *see also* Ex. 1003 ¶ 356. Petitioner contends that these disclosures are supported by disclosures in Yang’s provisional application. Pet. 58 (citing Ex. 1009, 66, 83–84; Ex. 1003 ¶ 359).

In addition, Petitioner asserts that, to the extent Yang does not disclose limitation 3.3, it would have been obvious over Yang and the POSA’s knowledge of the art. According to Petitioner, and Petitioner’s declarant, Dr. Mahon, it was “well known . . . that TBs could be . . . subdivided in CBs or CBGs and that UEs could transmit HARQ-ACK bits on either a TB or CBG basis to improve the efficiency of the system and potentially prevent the need for retransmission of an entire TB whenever a NACK signal is received.” Pet. 59; Ex. 1003 ¶ 360. Petitioner asserts that it was also known that it was desirable to transmit one HARQ-ACK per TB in some instances and one HARQ-ACK bit per CBG in other instances. *Id.* Petitioner explains that there are a limited number of ways to “distinguish between one HARQ-ACK transmission method and another,” and therefore

the POSA would “immediately recognize that one such distinguishing characteristic to devise such a system around is search space configuration, such that one HARQ-ACK bit is transmitted per TB in one search space configuration (*e.g.*, CSS), while one HARQ-ACK bit is transmitted per CBG in another search space configuration.” *Id.*

Patent Owner argues that the Petition is “deficient because none of its citations to Yang disclose either (i) the scheduling of a PDSCH in a common search space; or (ii) any configuration of the number of bits of HARQ-ACK received for the transport block.” Prelim. Resp. 16. As an example, Patent Owner argues that “the Petition makes a conclusory statement that ‘Yang discloses utilizing one HARQ-ACK bit for the transport block when the PDSCH is scheduled in a CSS’ but the statement in the Petition or Petitioner’s expert declaration (just a single sentence) is not supported by any evidence.” *Id.* at 16–17. According to Patent Owner, “[n]one of the citations to Yang in the Petition even mention the number of HARQ-ACK bits.” *Id.* at 17.

As discussed above, the parties appear to agree that the requirement that the PDSCH be “scheduled in a common search space (CSS)” means that a “PDCCH transmits in a search space and carries control information to schedule/allocate the PDSCH.” Prelim. Reply. 1; Prelim Sur-reply 1; Ex. 1013 ¶¶ 224–225.

Yang discloses differentiating CBG based HARQ-ACK feedback based on whether a transmission is scheduled in CSS or USS, providing “per-CBG” HARQ-ACK feedback for USS transmissions and “per-TB” HARQ-ACK feedback for CSS transmissions. Ex. 1005, 37:63–38:7. Specifically, Yang discloses:

Hence, ***for DL/UL data transmission scheduled through DCI*** (or TM-dedicated DCI format set/used for specific TM only) ***transmission based not on CSS but on USS***, a CBG-unit retransmission scheduling and per-CBG A/N feedback configuration operation is applicable/configurable. On the other hand, ***for DL/UL data (and/or Msg3/4) transmission scheduled through CSS based DCI*** (or TM common DCI format) transmission, a TB-unit retransmission scheduling and per-TB (TB level) A/N feedback operation is applicable/configurable (i.e., TB-level A/N feedback is configured).

Id. at 37:63–38:7 (emphasis added). On this preliminary record, this disclosure tends to support that Yang discloses that its DCI was in a CSS and scheduled the DL/UL data transmission (PDSCH) for which HARQ-ACK feedback occurred. The preliminary record thus supports that the PDCCH transmits in a search space and carries control information to schedule/allocate the PDSCH, as the parties agree the claim requires.

As to Patent Owner’s argument that Yang does not disclose the number of bits of HARQ-ACK received for the transport block, Yang discloses scheduling a “per-CBG” HARQ-ACK for CSS transmissions and a “per-TB” HARQ-ACK for USS transmissions. *Id.* On this preliminary record, this supports that Yang discloses using one HARQ-ACK bit for the transport block when the PDSCH is scheduled in a CSS and using HARQ-ACK bits for all CBGs when the PDSCH is scheduled in a USS. Ex. 1003 ¶¶ 358, 368 (testimony of Dr. Mahon to this effect). Patent Owner criticizes Dr. Mahon’s testimony on this point as unsupported because it is not followed by citations. Prelim. Resp. 17. But the testimony at issue begins with the word “thus,” which refers back to the prior discussion. *See* Ex. 1003 ¶¶ 358, 368 (“Thus, Yang discloses . . .”). Dr. Mahon’s testimony is, thus, supported. Patent Owner argues that “[n]one of the citations to Yang in the Petition even mention the number of HARQ-ACK bits.”

Prelim. Resp. 17. However, on this preliminary record, which lacks testimonial evidence from Patent Owner, we interpret Yang’s disclosure of “per-TB (TB level) A/N feedback” to refer to one bit per-TB HARQ-ACK feedback.

Accordingly, the preliminary record tends to support that Yang discloses limitation 3.3.

e) Limitation 3.4

Claim limitation 3.4 requires that, “for the CBG based HARQ-ACK corresponding to the PDSCH which is scheduled in a UE-specific search space (USS), the receiving circuitry is configured to receive HARQ-ACK bits of all CBGs.” Ex. 1001, 24:7–11. Petitioner contends that Yang discloses and/or renders this claim element obvious. Pet. 60–63. For this limitation, Petitioner relies on the same disclosures in Yang that were discussed in connection with limitation 3.3, with the only difference being that it focuses on the per-CBG rather than the per-TB aspect of Yang’s HARQ-ACK feedback method. *Id.* at 35. Patent Owner’s arguments with respect to this limitation are similar to its arguments for limitation 3.3 and we find them unavailing on this preliminary record for the reasons discussed above.

f) Conclusion for claim 3

For the reasons discussed above, the preliminary record supports that Yang teaches or suggests each of the elements of claim 3.

g) Claims 1, 2, 4, and 5

Petitioner contends that claims 1, 2, 4, and 5 are taught or suggested in the prior art, and that the skilled artisan would have predictably modified the prior art to the extent needed to arrive at the claimed subject matter with a

reasonable expectation of success. Pet. 63–69. Petitioner’s contentions are supported by citation to the prior art and declarant testimony. *Id.* Patent Owner does not differentiate its arguments by claim, relying on the same arguments for all of the claims. Prelim. Resp. 20–21. On this preliminary record, and for the reasons discussed above, we find Patent Owner’s arguments unavailing.

IV. CONCLUSION

Upon consideration of the Petition, the Preliminary Response, the Preliminary Reply, and the Preliminary Sur-reply as well as the accompanying evidence, we find that the Petition presents compelling evidence of the unpatentability of the challenged claims. Accordingly, we grant Petitioner’s request that we institute *inter partes* of claims 1–5 of the ’443 patent.

V. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, under 35 U.S.C. § 314(a), an *inter partes* review of claims 1–5 of the ’443 patent is instituted for all grounds in the Petition; and

FURTHER ORDERED that, under 35 U.S.C. § 314(a), *inter partes* review of the ’443 patent is instituted on this Decision’s entry date, and under 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is given of the trial’s institution.

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FOR PETITIONER:

Patrick McPherson
Kevin Anderson
DUANE MORRIS LLP
pdmcperson@duanemorris.com
kpanderson@duanemorris.com

FOR PATENT OWNER:

Vincent Rubino
Peter Lambrianakos
Enrique Iturralde
Julian Pymonto
Jacob Ostling
FABRICANT LLP
vrubino@fabricantllp.com
plambrianakos@fabricantllp.com
eiturralde@fabricantllp.com
jpymonto@fabricantllp.com
jostling@fabricantllp.com