

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD. and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner,

v.

EMPIRE TECHNOLOGY DEVELOPMENT LLC,
Patent Owner.

IPR2024-00896
Patent 8,798,120 B2

Before NABEEL U. KHAN, SHARON FENICK, and
ANDREAS BALTATZIS, *Administrative Patent Judges*.

BALTATZIS, *Administrative Patent Judge*.

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

I. INTRODUCTION

Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. (collectively, “Petitioner”) filed a Petition requesting an *inter partes* review of claims 25–29 (the “challenged claims”) of U.S. Patent No. 8,798,120 B2 (Ex. 1001, “the ’120 patent”). Paper 3 (“Pet.”). Empire Technology Development LLC (“Patent Owner”) filed a Preliminary Response. Paper 11 (“Prelim. Resp.”). With our authorization, Petitioner filed a Preliminary Reply (Paper 13, “Prelim. Reply”) and Patent Owner filed a Preliminary Sur-Reply (Paper 14, “Prelim. Sur-Reply”).

Under 35 U.S.C. § 314(a), the Board “may not authorize an *inter partes* review to be instituted unless . . . the information presented in the petition . . . and any response . . . 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.” After considering the Petition, the Preliminary Response, the Preliminary Reply, the Preliminary Sur-Reply, and the evidence of record, we determine that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to at least one claim challenged in the Petition. Accordingly, we institute an *inter partes* review of claims 25–29 of the ’120 patent, based on all of the grounds identified in the Petition.

The following findings of fact and conclusions of law are not final, but are made for the sole purpose of determining whether Petitioner meets the threshold for initiating review. Any final decision shall be based on the full trial record, including any response timely filed by Patent Owner. Any arguments not raised by Patent Owner in a timely-filed Response may be deemed waived, even if they were presented in the Preliminary Response.

II. BACKGROUND

A. Real Parties in Interest

Petitioner identifies Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc. as the real parties in interest. *See* Pet. 1. Patent Owner identifies Empire Technology Development LLC as the real party in interest. Paper 9, 1.

B. Related Matters

The parties identify the following district court litigation involving the '120 patent: *Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.*, No. 2:23-cv-00427 (E.D. Tex.) (“parallel litigation”). Pet. 1; Paper 9, 1.

C. The '120 Patent

The '120 patent relates to methods and systems for “selecting a transmit mode in a communications system.” Ex. 1001, 2:12–14. The communication system may be capable of transmitting in a multiple-input multiple-output (“MIMO”) mode or a single-input multiple-output (“SIMO”) mode. *Id.* at 2:14–24, 32–39. “MIMO and SIMO systems may find use in a variety of applications including, but not limited to, wireless networks, cellular systems including 3G and 4G systems, such as 3GPP LTE-Advanced, local and wide area networks, and wireless broadband systems.” *Id.* at 1:29–33.

Figure 4 illustrates a communication system that can select between MIMO and SIMO modes, and is reproduced below.

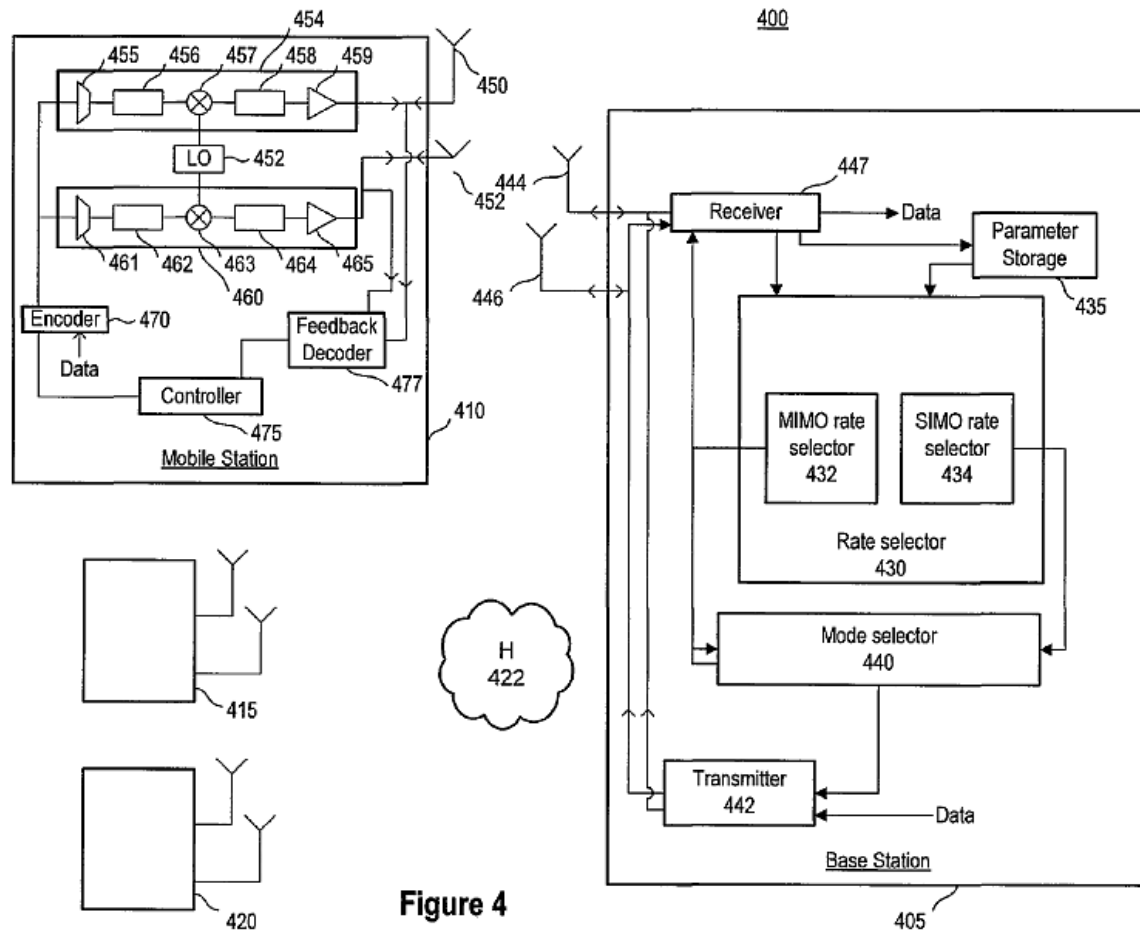


Figure 4

Figure 4 is a schematic illustration of a communication system. *Id.* at 1:55–57.

Figure 4 illustrates communications system 400 including base station 405 “configured to communicate” over communications channel 422 with mobile stations 410, 415, and 420. *Id.* at 7:1–8. Exemplary mobile stations include cellular phones, laptop computers, and “similar computing devices that are configured for MIMO/SIMO communications.” *Id.* at 10:50–62. Figure 4 shows details as to mobile station 410 that may be analogous to mobile stations 415 and 420. *See id.* at 7:36–38. For example, mobile station 410 includes controller 475 coupled to encoder 407 further coupled to first circuitry 454 and second circuitry 460. *Id.* at 7:18–30. “First circuitry 454 is coupled to the antenna 450 and configured to process signals

for transmission by the antenna 450.” *Id.* at 7:18–20. “Second circuitry 460 may be coupled to the antenna 452 and configured to process signals for transmission by the antenna 452.” *Id.* at 7:23–25. Controller 475 is configured to provide a signal to encoder 470 to operate in MIMO mode by using both antennas 450 and 452 or SIMO mode by using either antenna 450 or 452. *Id.* at 7:30–33, 11:44–50.

Base station 405 includes mode selector 440 coupled to rate selector 430 and transmitter 442. *Id.* at 7:8–12. Rate selector 430 may also be provided at mobile stations 410, 415, and 420. *Id.* at 8:10–12. In an example, rate selector 430 includes MIMO rate selector 432 and SIMO rate selector 434. *Id.* 7:8–10, 8:19–20. The rate selectors may be configured to calculate transmission rates based on an energy-optimized rate for each respective mode. *See id.* at 8:23–33. For example:

MIMO and SIMO rate selectors 432 and 434 may . . . make use of one or multiple parameters of the communications system 400 in calculating the first and second transmission rates, as generally described above, including, but not limited to, idle power consumption of one or more mobile stations, transmission circuitry power consumption of one or more mobile stations, number of users of the communications system, number of receive antennas at the base station or one or more mobile stations, and variations in the communications channel 422.

Id. at 8:34–43. “[I]dle time may include times during which the mobile station 410 is waiting to send data over the communications channel.” *Id.* at 8:55–58; *see also id.* at 2:60–62, 3:2–10.

D. Illustrative Claims

Independent claims 25 and 29 are representative of the challenged claims and are reproduced below.¹ Challenged claims 26–28 depend from claim 25.

25. [pre] A mobile station for use in a communications system comprising:

[a] a first antenna and a second antenna;

[b] first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;

second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and

[c] a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and,

[d] in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel,

[e] wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry,

[f] wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.

¹ We adopt Petitioner's bracketed identifiers.

Ex. 1001, 19:1–20.

29. [pre] A mobile station for use in a communications system comprising:

[a] a first antenna and a second antenna;

[b] first circuitry coupled to the first antenna and configured to process signals for transmission by the first antenna;

second circuitry coupled to the second antenna and configured to process signals for transmission by the second antenna; and

[c] a controller coupled to the first and second circuitry, wherein the controller is configured to receive a control signal and,

[d] in accordance with the control signal, to select between a multiple-input multiple-output (MIMO) mode wherein both the first and second antennas transmit data over a communications channel and a single-input multiple-output (SIMO) mode wherein only one of the first and second antennas transmit data over a communications channel,

[e] wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry,

[f] wherein the control signal is based, at least in part, on a number of users of the communications system.

Id. at 20:3–24.

E. Asserted Evidence

Petitioner relies on the following references in its asserted grounds of unpatentability:

Name	Reference	Ex. No.
Li	US 2006/0067263 A1	1005
Wu	US 2007/0171808 A1	1009
Cui-2003	Shuguang Cui et al., <i>Modulation Optimization Under Energy Constraints</i> , 4 Institute of Electrical and Electronic Engineers International Conference on Communications 2805–2811 (2003)	1007
Tiirola	Esa Tiirola et al., <i>Performance of a UMTS Uplink MIMO Scheme</i> , 1 Institute of Electrical and Electronic Engineers 58 th Vehicular Technology Conference 657–661 (2003)	1008
Siam	Mohammad Z. Siam et al., <i>Adaptive Multi-antenna Power Control in Wireless Networks</i> , International Conference on Wireless Communications and Mobile Computing 875–880 (2006)	1006

F. Asserted Grounds

Petitioner asserts that claims 25–29 would have been unpatentable on the following grounds:

Claim(s) Challenged	35 U.S.C. § ²	Reference(s)/Basis
25, 27, 28	103(a)	Li, Siam
25, 27, 28	103(a)	Li, Siam, Cui-2003
26	103(a)	Li, Siam, Wu
26	103(a)	Li, Siam, Cui-2003, Wu
29	103(a)	Li, Siam, Tiirola

² The Leahy-Smith America Invents Act, Pub. L. No. 112-29, 125 Stat. 284 (2011) (“AIA”), included revisions to 35 U.S.C. §§ 102 and 103 that became effective on March 16, 2013, after the filing of the application to which the ’120 patent claims priority. *See* Ex. 1001, code (60). Therefore, we apply the pre-AIA versions of Sections 102 and 103.

Petitioner supports its challenges with a declaration from Matthew C. Valenti, Ph.D. Ex. 1002.

III. DISCRETIONARY DENIAL

A. 35 U.S.C. § 314(a) (*Parallel District Court Litigation*)

Patent Owner argues that we should exercise discretion to deny institution under 35 U.S.C. § 314(a) because the factors identified in *Apple, Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential) (“*Fintiv*”), weigh in favor of denying institution. Prelim. Resp. 40–53. Petitioner argues we should not discretionarily deny institution under 35 U.S.C. § 314(a). Pet. 68.

Under Section 314(a), the Director has discretion to deny institution. *See* 35 U.S.C. § 314(a) (stating “[t]he Director may not authorize an inter partes review to be instituted unless the Director determines that the information presented in 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”); *SAS Inst. Inc. v. Iancu*, 138 S. Ct. 1348, 1356 (2018) (“[Section] 314(a) invests the Director with discretion on the question whether to institute review.” (emphasis omitted)); *Cuozzo Speed Techs., LLC v. Lee*, 136 S. Ct. 2131, 2140 (2016) (“[T]he agency’s decision to deny a petition is a matter committed to the Patent Office’s discretion.”); *Harmonic Inc. v. Avid Tech, Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016) (“[T]he PTO is permitted, but never compelled, to institute an IPR proceeding.”).

In determining whether to exercise this discretion based on a related litigation, the Board assesses all relevant circumstances, including the merits, to balance considerations such as system efficiency, fairness, and

patent quality. *See Fintiv*, Paper 11; *NHK Spring Co. v. Intri-Plex Techs., Inc.*, IPR2018-00752, Paper 8 at 19–20 (PTAB Sept. 12, 2018) (precedential). We consider six factors as part of this balanced assessment when determining whether to use our discretion to deny institution:

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

Fintiv, Paper 11 at 5–6. 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.

On June 21, 2022, the Director issued an Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation (“*Fintiv* Guidance”).³ The *Fintiv* Guidance provides “several clarifications” to “the PTAB’s current application of *Fintiv* to discretionary denial where there is parallel litigation” in response to

³ Available at www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf.

comments received from stakeholders following a Request for Comments.
Fintiv Guidance 2.

Upon Petitioner’s request, we authorized Petitioner to file a “*Sotera*-type stipulation” that “specifies that for each of the above petitions, if the PTAB institutes review, Samsung will not pursue in district court any ground of invalidity raised or that could have been reasonably raised in the corresponding IPR.” *See* Ex. 1047; *see also Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 16–19 (PTAB Dec. 1, 2020) (precedential as to § II.A). Petitioner filed a stipulation (*see* Ex. 1046), but Petitioner’s stipulation is not identical to that used in *Sotera* or referenced by the Director’s *Fintiv* memo, as we discuss in more detail below.

Accordingly, we do not apply Petitioner’s stipulation without weighing the *Fintiv* factors as contemplated by the *Fintiv* Guidance, whereas we would apply Petitioner’s stipulation if this were a case in which a *Sotera*-type stipulation had been filed. *See Fintiv* Guidance 7 (“[T]he PTAB will not discretionarily deny institution of an IPR or PGR in view of parallel district court litigation where a petitioner stipulates not to pursue in a parallel district court proceeding the same grounds as in the petition or any grounds that could have reasonably been raised in the petition.”). We weigh the *Fintiv* factors below.

1. Stay in the Parallel Proceeding (Factor 1)

Under the first *Fintiv* factor, we consider “whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted.” *Fintiv*, Paper 11 at 6. Patent Owner contends that this factor weighs in favor of denial because Petitioner has “not filed a motion to stay the parallel district court litigation.” Prelim. Resp. 42. Patent Owner also asserts that

prior decisions by the district court suggest that a motion to stay, if filed, is unlikely to be granted. *Id.* at 42–43.

On this record, no stay has been requested and we decline to speculate on how a district court will act if a stay is requested. Determinations whether or not to stay any individual case, including the related one, are 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. — Trucking LLC*, IPR2019-01393, Paper 24 at 7 (PTAB June 16, 2020) (informative). Accordingly, factor 1 is neutral.

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

Under the second *Fintiv* factor, we consider the “proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision.” *Fintiv*, Paper 11 at 6. Patent Owner states that the trial date in the parallel litigation is set for June 23, 2025, “which is approximately six months before the statutory deadline for the Board’s final written decision on December 18, 2025.” Prelim. Resp. 44 (citing Ex. 2006). Patent Owner also argues that the trial date in this proceeding is approximately 21 months “after the case was filed,” which “is consistent with the most current time-to-trial statistics for the Eastern District of Texas.” *Id.* at 44–45 (citing Ex. 2007).

We agree with Patent Owner’s analysis based on the schedule in the district court’s docket control order and the time-to-trial statistics. Exs. 2006, 2007. As the parallel litigation is scheduled to go to trial in June 2025, approximately six months before a final written decision would be entered in this proceeding, factor 2 weighs in favor of exercising discretion to deny institution.

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

Under the third *Fintiv* factor, we consider “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” and the timing of the petition. *Fintiv*, Paper 11 at 9–12. Patent Owner argues that there is significant investment in the parallel litigation. Prelim. Resp. 45–48. For example, Patent Owner argues that the parties exchanged infringement and invalidity contentions and completed significant fact discovery. *Id.* at 46–47. Patent Owner further argues that *Markman* hearing briefing will take place before the statutory deadline for the institution decision in this proceeding. *Id.* (citing Ex. 2006).

The docket control order from the district court shows that numerous milestones in the parallel litigation will occur after the statutory deadline for the institution decision (i.e., December 18, 2024). *See* Ex. 2006. For example, the *Markman* hearing is scheduled for January 22, 2025, the deadline to complete fact discovery is February 3, 2025, and the deadline to complete expert discovery is March 10, 2025. *Id.* Accordingly, we find significant investment remains in the parallel litigation and the investment at the time of the institution decision does not weigh in favor of exercising our discretion to deny.

Patent Owner also argues that Petitioner “significantly delayed in filing this IPR,” three months after serving invalidity contentions, which were served more than six months after Patent Owner filed its complaint. Prelim. Resp. 52. In other words, Patent Owner argues that Petitioner delayed in filing the Petition until approximately nine months after the complaint. We do not agree with Patent Owner that Petitioner significantly delayed by filing this IPR nine months after the complaint. For example, there is no requirement that the Petition be filed contemporaneously with

invalidity contentions in the parallel litigation. *See Sotera*, Paper 12 at 17 (finding it reasonable where “Petitioner filed its Petition approximately two months after serving its initial invalidity contentions, and approximately two weeks before the statutory deadline”). Nor has Patent Owner provided any other evidence of unreasonable delay. Accordingly, Petitioner’s filing this Petition approximately nine months after the complaint does not weigh in favor of exercising discretion to deny institution. Because significant investment remains in the parallel litigation and Petitioner did not delay in filing this Petition, factor 3 is neutral.

4. *Overlap of Issues (Factor 4)*

Under the fourth *Fintiv* factor, we consider “overlap between issues raised in the petition and in the parallel proceeding.” *Fintiv*, Paper 11 at 12. Petitioner stipulates that “[i]f the PTAB institutes the pending IPR in IPR2024-00896 *challenging the patentability of claims 25–29 of the ’120 Patent*, then Samsung will not pursue as to the challenged claims any ground raised or that could have been reasonably raised in the IPR” in the co-pending district court litigation. Ex. 1046 (citing *Sotera*, Paper 12, 16–19) (emphasis added). Petitioner’s stipulation is not identical to that in *Sotera* and we decline to expand the categorical resolution of *Fintiv* outside the Director’s clear language. *See Fintiv* Guidance. Nevertheless, Petitioner’s stipulation here mitigates certain concerns of duplicative efforts between the district court and the Board, as well as concerns of potentially conflicting decisions. Thus, factor 4 weighs strongly in favor of not exercising discretion to deny institution.

5. *Identity of Parties (Factor 5)*

Under the fifth *Fintiv* factor, we consider “whether the petitioner and the defendant in the parallel proceeding are the same party.” *Fintiv*, Paper 11

at 13. Patent Owner asserts that denying institution is supported because the same parties are involved in both the present proceeding and the parallel litigation. Prelim. Resp. 50–51.

We agree that the same parties are involved. Accordingly, factor 5 weighs in favor exercising discretion to deny institution.

6. Other Circumstances Including the Merits (Factor 6)

Under the sixth *Fintiv* factor, we consider “other circumstances that impact the Board’s exercise of discretion, including the merits.” *Fintiv*, Paper 11 at 14. Patent Owner argues that the “Petition offers no compelling argument on the merits because the Petition suffers from significant weaknesses and gaps in proof.” Prelim. Resp. 51. Before we address the compelling merits question, we first assess *Fintiv* factors 1–5 to see if that analysis supports discretionary denial. *See CommScope Tech. v. Dali Wireless*, IPR2022-01242, Paper 23, 6 (Vidal Feb. 27, 2023) (precedential).

In sum, *Fintiv* factors 1 and 4 are neutral, factors 2 and 5 weigh in favor of denial, and factor 4 weighs strongly against denial. Collectively, the first five *Fintiv* factors do not favor exercising discretion to deny the Petition. Accordingly, we need not consider whether the merits are compelling. *See CommScope*, Paper 23 at 4–5 (“in circumstances where the Board determines that the other *Fintiv* factors 1–5 do not favor discretionary denial, the Board shall decline to discretionarily deny under *Fintiv* without reaching the compelling merits analysis.”).

Patent Owner does not present any additional arguments as to *Fintiv* factor 6, apart from arguing that Petitioner unreasonably delayed the filing of the Petition, which we address in our discussion of *Fintiv* factor 3. *See* Prelim. Resp. 51–52. We do not identify any other circumstances that would impact our exercise of discretion. Accordingly, factor 6 is neutral.

7. *Fintiv Conclusion*

Our holistic review of the *Fintiv* factors, namely that the timing of the Petition was reasonable, the relatively limited investment in the parallel proceeding to date, the absence of other circumstances, and the minimal potential overlap of the two proceedings, indicates that the *Fintiv* factors do not favor discretionary denial, despite the earlier date of the district court trial. *See* Interim *Fintiv* Guidance 8 (“[W]hen analyzing the proximity of the court’s trial date under factor two of *Fintiv*, when other relevant factors weigh against exercising discretion to deny institution or are neutral, the proximity to trial should not alone outweigh all of those other factors.”). As such, we are not persuaded that the interests of efficiency and integrity of the system would be best served by invoking our authority under 35 U.S.C. § 314(a) to deny institution of a meritorious petition. For the reasons discussed above, we decline to exercise discretion to deny institution under § 314(a).

B. 35 U.S.C. § 325(d)

The Director may deny institution of *inter partes* review when “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d). We apply a two-part test when evaluating whether to exercise discretion under § 325(d). *See Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (Feb. 13, 2020) (precedential) (“*Advanced Bionics*”). Specifically, we consider:

- (1) whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office;
- and (2) if either condition of first part of the framework is satisfied, whether the petitioner has demonstrated that the

Office erred in a manner material to the patentability of challenged claims.

Id. In doing so, we consider the factors discussed in *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, IPR2017-01586, Paper 8 (Dec. 15, 2017) (precedential as to § III.C.5, first para.; informative) (“*Becton, Dickinson*”). *Id.* at 9–11.

In particular, we consider *Becton, Dickinson* factors (a), (b), and (d) to determine whether the same or substantially the same prior art or arguments previously were presented to the Office. *Id.* at 10. These factors relate to:

(a) the similarities and material differences between the asserted art and the prior art involved during examination; (b) the cumulative nature of the asserted art and the prior art evaluated during examination; . . . [and] (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art.

Becton, Dickinson, 17–18.

Petitioner argues that “[n]one of the references relied upon in this petition (Li, Siam, Cui-2003, Wu, and Tirola) was cited or discussed by the examiner.” Pet. 22. Accordingly, Petitioner argues that the same or substantially the same art was not previously presented to the Office. *See id.* at 21–22. Petitioner further argues that Cui-2003 is not cumulative to Cui-2004⁴, of record during prosecution, because Cui-2004 does not teach idle power consumption. *Id.* at 22 n.6.

⁴ Shuguang Cui et al., *Energy-Efficiency of MIMO and Cooperative MIMO Techniques in Sensor Networks*, 22 Institute of Electrical and Electronic Engineers Selected Areas in Communications 1089–1098 (Aug. 2004) (Ex. 1026).

Patent Owner argues “all of Petitioners’ asserted references are cumulative of Xu⁵, Cui-2004, [Cui-2005]⁶, Bougard⁷, and [Gesbert]⁸, which were references of record during the prosecution of the ’120 Patent.” Prelim. Resp. 14. We focus our analysis on Patent Owner’s comparison of the cited art to Li (allegedly teaching the “idle power consumption” limitation)⁹ and Tirola (allegedly teaching the “number of users” limitation).

1. Whether Li is Cumulative to the References of Record

Patent Owner asserts “[w]ith respect to claim 25 (and dependent claims 27 and 28), the Notice of Allowance stated that ‘the prior art of record fails to anticipate or render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing.’” Prelim. Resp. 15 (citing Ex. 1002, 189). Patent Owner argues that “[l]ike the prior art considered during examination, Li and Siam also do not disclose the limitation regarding the consideration of idle power in the construction of the relevant control signal.” *Id.*

Patent Owner acknowledges that Li identifies inefficient power use in “idle mode” as a problem for wireless communication devices. *Id.* (citing Ex. 1005 ¶ 18). However, Patent Owner argues that “Li does not teach

⁵ US 8,081,698 B2 (Ex. 2004).

⁶ Shuguang Cui et al., *Energy-Constrained Modulation Optimization*, 4 Institute of Electrical and Electronic Engineers Transactions of Wireless Communications 2349–2360 (Sept. 2005) (Ex. 1025).

⁷ Bruno Bougard et al., *SmartMIMO: An Energy-Aware Adaptive MIMO-OFDM Radio Link Control for Next-Generation Wireless Local Area Networks*, EURASIP Journal on Wireless Communications and Networking (2007) (Ex. 1033).

⁸ US 2002/0056066 A1 (Ex. 2005).

⁹ Because we find the cited references not cumulative to Li, we need not address Patent Owner’s argument as to Cui-2003. *See* Prelim. Resp. 18–22.

selecting SIMO or MIMO in accordance with a control signal based, at least in part, on an idle power consumption of the device.” *Id.* at 15–16. Instead, Patent Owner argues that Li’s disclosure is “substantially the same as that in Xu.” *Id.* at 16–17 (citing Ex. 1005 ¶¶ 19–24; Ex. 2004, 8:18–44). Patent Owner’s cited portion of Xu—also cited by the Examiner—discloses selecting SIMO or MIMO using a control signal based on a “requested data rate.” Ex. 2004, 8:18–44; Ex. 1004, 148, 153. But unlike Li’s express teachings (that we address in detail below), Xu does not mention idle power consumption, nor identify idle power consumption as a problem to be solved by switching between operating modes. *See* Ex. 1005 ¶¶ 18–19.

For this reason, we find there is a material difference between the asserted art (Li) and the prior art involved during examination (Xu). *See Becton, Dickinson*, 17–18. Additionally, we do not agree with Patent Owner that substantially the same argument—that Li teaches the “idle power consumption” limitation—was considered by the Examiner. Rather, the Examiner’s finding that the prior art did not teach the “idle power consumption” limitation in the reasons for allowance (Ex. 1004, 189) indicates the absence of overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art. *See Becton, Dickinson*, 17–18. Because there is a material difference between Li and Xu, and Li raises an issue not previously identified by the Examiner, we are not persuaded that the same or substantially the same art or the same or substantially the same arguments previously were presented to the Office.

2. *Whether Tiirola is Cumulative to the References of Record*

Patent Owner argues that “Tiirola is cumulative over the prior art references of Xu, Cui-2004, and Bougard that the Examiner found did not teach the ‘number of users limitation in allowing claim 29.’” Prelim. Resp. 23

(citing Ex. 1004, 147, 153). More specifically, Patent Owner asserts that “Tirola does not suggest using a control signal that takes into account the number of users. In fact, Tirola does not teach selection of transmission modes at all, and instead teaches away from transmitting in MIMO” *Id.*

Patent Owner cites to the prosecution history (Prelim. Resp. 23), where the Examiner found claims allowable because “the prior art of record fails to anticipate or render obvious the limitations regarding the indication of the number of users in the channel environment factoring into the mode selection determination” (Ex. 1004, 153). As we discuss below, Tirola accounts for the number of users when comparing a wireless device’s performance in different operating modes. *See, e.g.*, Ex. 1008, 660. Patent Owner does not identify a similar teaching in the art of record considered by the Examiner, nor compare Tirola to the art of record. Accordingly, we are not persuaded that Tirola is the same as or substantially similar art to Xu, Cui-2004, and/or Bougard, or that Petitioner’s grounds citing Tirola present the same or substantially the same arguments as to Xu, Cui-2004, and/or Bougard.

3. *Section 325(d) Conclusion*

Li and Tirola are not the same or substantially similar to the art cited during examination, and there is no evidence that the same or substantially the same arguments were previously presented to the Office. Accordingly, the first part of the *Advanced Bionics* test is not satisfied, and we need not reach the second part, whether the Petition has demonstrated material error. *See Advanced Bionics*, Paper 6 at 8. We decline to exercise discretion to deny institution under § 325(d).

IV. PATENTABILITY ANALYSIS

A. Legal Standards

“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.*, 815 F.3d at 1363 (citing 35 U.S.C. § 312(a)(3) (requiring *inter partes* review petitions to identify “with particularity . . . the evidence that supports the grounds for the challenge to each claim”)). This burden never shifts to Patent Owner. *See Dynamic Drinkware, LLC v. Nat’l Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015) (citing *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1326–27 (Fed. Cir. 2008)) (discussing the burden of proof in *inter partes* review). Furthermore, Petitioner must explain with particularity how the prior art would have rendered the challenged claims unpatentable. 35 U.S.C. § 312(a)(3); 37 C.F.R. § 42.104(b)(4) (“The petition must specify where each element of the claim is found in the prior art patents or printed publications relied upon.”).

A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious to a person having ordinary skill in the art to which said subject matter pertains. *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 skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary

considerations.¹⁰ *See Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

Petitioner argues that a person of ordinary skill in the art (“POSITA”) relevant to the challenged claims, as of the earliest claimed priority date, “would have had a bachelor’s degree in electrical engineering, computer science, computer engineering, or a related field, and two-to-three years of experience in the research, design, development, or testing of wireless data communication systems at the physical and media access control (MAC) layer.” Pet. 8 (citing Ex. 1002 ¶¶ 30–34).

At this time, Patent Owner does not oppose Petitioner’s definition of a person of ordinary skill in the art. Prelim. Resp. 10.

On this record and for the purposes of institution, we determine Petitioner’s proposed level of skill comports with the qualifications a person would have needed to understand and implement the teachings of the ’120 patent and the prior art of record.

C. Claim Construction

We construe claim terms according to the standard set forth in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (en banc), i.e., as construed in a civil action under 35 U.S.C. § 282(b). *See* 37 C.F.R. § 42.100(b). Under *Phillips*, claim terms are afforded “their ordinary and customary meaning.” *Id.* at 1312. “[T]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.” *Id.* at 1313.

¹⁰ In the present record, neither party presents arguments or evidence relating to secondary considerations.

“Importantly, the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification.” *Id.*

The parties, in their initial briefs, argue that no claim terms require express construction. *See* Pet. 9; Prelim. Resp. 10–11. However, Petitioner requested and we authorized additional briefing to address an alleged “implicit” claim construction by Patent Owner in the Preliminary Response. *See* Prelim. Reply 1; Ex. 1047. Specifically, briefing concerned the claim construction of “idle power consumption,” which we address below. *See* Prelim. Reply; Prelim. Sur-Reply.

1. “*idle power consumption*”

Claim 25 recites “wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.” Ex. 1001, 19:18–20. Patent Owner argues that the plain and ordinary meaning of “‘idle power consumption’ refer[s] to times when the circuitry of the device is powered on and waiting to transmit data over the communications channel.” Prelim. Resp. 29 (citing Ex. 1001, 2:60–64, 3:3–5).¹¹ Patent Owner argues that the intrinsic evidence supports this interpretation. For example, Patent Owner cites to the ’120 patent (*id.* at 29) that states: “idle time is a time during which the transceiver may be waiting to send data over the communications channel,” (Ex. 1001, 2:60–63) and “if the transmission rate is too slow, a

¹¹ Patent Owner raises this argument to distinguish Cui-2003, which, according to Patent Owner, “describes sleep mode [] ‘where all the circuits in the signal path are shut down for energy saving.’” Prelim. Resp. 30 (citing Ex. 1007, 2806) (emphasis omitted). We address below (§ IV.E.3) Patent Owner’s argument as to Cui-2003.

greater number of transceivers may become idle, waiting to send transmissions over the communications channel” (*id.* at 3:3–5).

Patent Owner also argues the extrinsic evidence supports interpreting idle power consumption as “powered on and waiting to transmit data.” *See* Prelim. Resp. 30–33. For example, Patent Owner notes the “vast difference in power” between Cui-2003’s “sleep mode” that consumes “almost no power” and Li’s “idle mode [that] ‘may consume approximately 60% of its battery energy.’” *Id.* at 31 (citing Ex. 1007, 2806; Ex. 1005 ¶ 18). Patent Owner also argues Walton¹² “explicitly distinguishes idle mode from sleep mode.” *Id.* (citing Ex. 1031 ¶¶ 45–61, Figs. 3A–3B). According to Patent Owner, Walton “explains that ‘[i]n the Idle state, the wireless device may enable only a Subset (e.g., one) of the N receiver units and only the processing unit(s) used for signal detection and acquisition’” but “[i]n the Sleep state, wireless device 100a may shut down as many circuit blocks as possible to conserve power.” *Id.* at 32 (citing Ex. 1031 ¶¶ 49, 51).

Petitioner responds that the ’120 patent “does not require all circuitry to be ‘powered on’ when evaluating idle power consumption.” Prelim. Reply 1. Petitioner argues “the ’120 Patent states ‘[e]ven if the idling transceivers *turn off their transmission chains, some idle power may be consumed* due to leakage current or other effects.’” *Id.* (citing Ex. 1001, 3:5–7). Petitioner further argues the ’120 patent’s description of power consumption during “idle time” does not support “the contention that all circuitry must be powered on during the ‘idle time.’” *Id.* at 2 (citing Prelim. Reply 29). As to the extrinsic evidence cited by Patent Owner, Petitioner asserts “it cannot overcome the ’120 Patent’s express inclusion, in its

¹² US 2005/0250452 A1 (Ex. 1031).

discussion of ‘idle power consumption,’ of leakage current during periods when the transmission chain is powered off.” *Id.* at 3.

Patent Owner responds that Petitioner seeks to “broaden [its] [original] interpretation of ‘idle power consumption’ in an effort to expand the scope of claim 25 onto prior art that was already found to be distinguishable during the original prosecution.” Prelim. Sur-Reply 1 (citing Ex. 1004, 105–109, 189). Patent Owner further argues “Petitioners are trying the same tactic in the district court by seeking an overbroad construction of ‘power used by the mobile station when it is not sending data.’” *Id.* (citing Ex. 2010, 8). Finally, Patent Owner argues “Petitioners’ position defies a common sense understanding of idling—a state characterized by being powered on but inactive,” and contradicts the arguments in the Petition and Dr. Valenti’s declaration. *Id.* at 2 (citing Pet. 25, 41, 46, 49; Ex. 1002 ¶¶ 86, 120, 134, 144).

On this record and for the purposes of institution, we preliminarily adopt Petitioner’s interpretation of the plain and ordinary meaning of the claims as consistent with the intrinsic evidence. Specifically, we preliminarily interpret “idle power consumption” as including power consumption during which the transceiver may be waiting to send data, whether the transceiver is on or off. The ’120 patent Specification refers to idle time as time during which the transceiver may be waiting to send data, whereby “[e]ven if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects.” Ex. 1001, 2:60–66, 3:5–7. The ’120 patent does not appear to define “idle power consumption” as requiring the circuitry to be powered on while “waiting to send data” nor exclude circuitry that is powered off while

waiting to send data. On this record, we do not read such a limitation into the claims. We invite the parties to further address this issue at trial.¹³

2. *Additional Claim Terms*

For purposes of institution, we determine that no other claim terms require express construction. *See Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017 (Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci. & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999) (“[O]nly those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy.”)).

D. *Asserted Obviousness of Claims 25, 27, and 28 over Li and Siam*

Petitioner argues that claims 25, 27, and 28 would have been obvious over Li and Siam. Pet. 24–44. Patent Owner disputes Petitioner’s contentions. Prelim. Resp. 24–28.

1. *Li (Ex. 1005)*

Li relates to techniques for improving control and management of “wireless communication devices with multiple antennas [that] include a multiple-input-multiple-output (MIMO) modulation and/or coding system to control receiving and transmitting of RF signals through the multiple antennas.” Ex. 1005 ¶ 1.

Li’s wireless system is illustrated in Figure 1, reproduced below.

¹³ We request that any claim construction arguments the parties rely upon during trial appear in a clearly designated section of briefing and note that such arguments should “point out the specific portions of the specification, prosecution history, and relevant extrinsic evidence” to be considered, with explanations of the relevancy of that evidence to the arguments presented. *See Patent Trial and Appeal Board Consolidated Trial Practice Guide*, at 46, 49 (Nov. 2019) (available at <https://www.uspto.gov/TrialPracticeGuide> Consolidated).

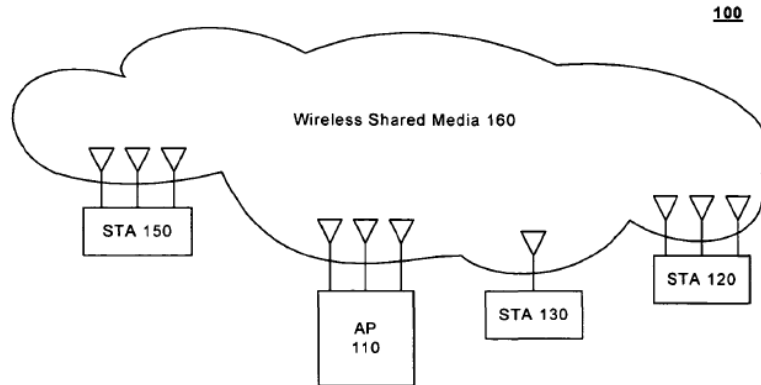


Figure 1 illustrates a block diagram of a wireless communication system. *Id.* ¶ 2.

Li explains that wireless communication system 100 may include access point (AP) 110 and various stations, STA 120, STA 130, and STA 150, all arranged to communicate information signals using wireless shared media 160. *Id.* ¶ 12. The stations “may operate in multiple operating modes.” *Id.* ¶ 17. The operating modes include a “single-input-single-output (SISO) mode, a multiple-input-single-input (MISO) mode, a single-input-multiple-output (SIMO) mode, and/or in a MIMO mode.” *Id.* “In a SIMO operating mode, one transmitter and two or more receivers may be used to communicate information signals over wireless shared media. In a MIMO operating mode, two or more transmitters and two or more receivers may be used to communicate information signals over wireless shared media.” *Id.*

Li discloses that:

One problem associated with wireless communication devices using carrier sense multiple access/collision detection (CSMA/CD) techniques (e.g., 802.11) is power consumption. For example, a station in idle mode waiting for incoming signals may consume approximately 60% of its battery energy. This inefficient use of energy may be exacerbated by MIMO devices, since more than one antenna may be turned on for reception. The power consumed by low noise amplifiers and

analog-to-digital converters may be multiplied by the number of antennas. As a result, a station may use less than 20% of its battery energy for communicating actual traffic.

Id. ¶ 18.

Li describes methods for solving the power consumption problem by switching a station's operating mode. *Id.* ¶ 19. More specifically, Li describes AP 110 sending "a request over wireless shared media 160 to switch STA 120 and STA 150 to a SIMO or MIMO operating mode, if desired. STA 120 and STA 150 may acknowledge the request and may enable an operation of desired number of receivers and transmitters of the MIMO receivers-transmitters system." *Id.* According to Li, "[i]n this manner, power consumption for STA 120 and STA 150 may be reduced, thereby extending the battery life for STA 120 and STA 150." *Id.*

2. *Siam (Ex. 1006)*

Siam relates to a power-controlled channel access protocol for MIMO-capable wireless local area networks (LANs) with two antennas per node. Ex. 1006, 875 (Abstr.). Siam describes modifying "the classic CSMA/CA access scheme" by dynamically adjusting "the 'transmission mode' and the transmission power on a per-packet basis so as to minimize the total energy consumption." *Id.* Siam's transmission modes are "one of the four possible transmit/receive antenna configurations: 1×1 (SISO), 2×1 (MISO), 1×2 (SIMO), and 2×2 (MIMO)." *Id.* Siam explains that "[w]hile the MIMO mode requires less RF transmission energy than the other three modes, it also incurs the highest circuit energy consumption. Depending on the transmitter-receiver distance, any of the four modes can be the 'optimal' one in terms of minimizing the *total* energy consumption." *Id.*

3. *Reason to Combine Li and Siam*

Petitioner asserts one of ordinary skill in the art “would have been motivated to combine Li and Siam (‘Li-Siam’), and would have had a reasonable expectation of success in doing so.” Pet. 24. Petitioner argues both references “describe systems that select an optimal data communication mode in a wireless communication system, from among SISO, MISO, SIMO, and MIMO modes, in order to reduce the total energy consumption of the system.” *Id.* (citing Ex. 1005 ¶¶ 18–19; Ex. 1006, 875; Ex. 1002 ¶¶ 85–89). Petitioner adds “Siam’s protocol expressly takes into consideration both radio frequency (RF) transmission power (i.e., what is radiated) and circuit power consumption (i.e., what is dissipated as heat).” *Id.* at 25–26 (citing Ex. 1006, 875–876).

Petitioner argues one skilled in the art “would have been motivated to improve Li’s mode-switching system by adding Siam’s teaching that expressly considers transmission and circuit power consumption to select an optimal transmit mode between SIMO and MIMO (or SISO and MISO) at the mobile station to minimize battery power consumption.” *Id.* at 26 (citing Ex. 1002 ¶¶ 90–91). And Petitioner argues one skilled in the art “would have had a reasonable expectation of success in combining the teachings of Li and Siam because they teach compatible systems—namely, electronic devices operating in accordance with IEEE 802.11 standard protocols or other data communications standards for wireless communication systems.” *Id.* at 26–27 (citing Ex. 1005 ¶¶ 12, 18–25; Ex. 1006, 875–878; Ex. 1002 ¶ 92).

At this stage, Patent Owner does not dispute Petitioner’s reason to combine Li and Siam. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that one

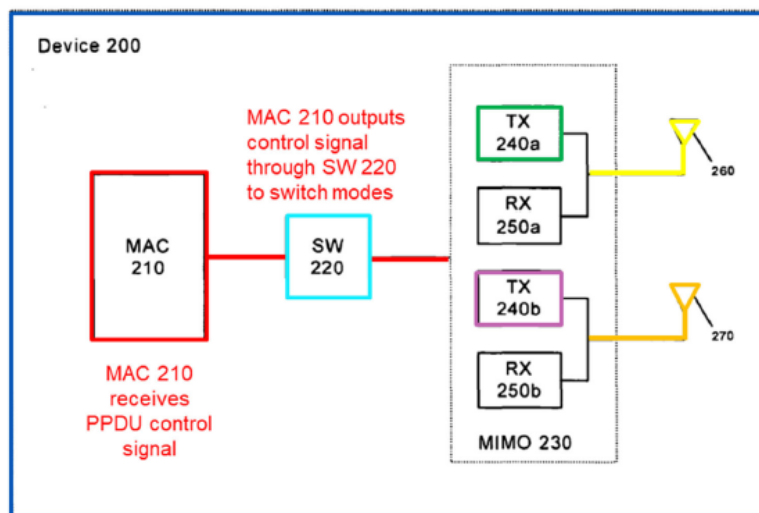
skilled in the art would have been motivated to combine Li and Siam and had a reasonable expectation of success in doing so.

4. Analysis of Claim 25

a) Preamble and Limitations 25[a]–25[d]

Petitioner asserts Li teaches or suggests a mobile station (*see* claim 25 preamble) including a first and a second antenna (*see* limitation 25[a]), and first and second circuitry, coupled to the first and second antenna, configured to process signals for transmission by the first and second antenna, respectively (*see* limitation 25[b]). Pet. 27–31 (citing Ex. 1005 ¶¶ 1, 13–15, 20, 21, 23, 52, 56, Figs. 1, 2; Ex. 1002 ¶¶ 93–98). Petitioner further asserts Li teaches or suggests a controller coupled to the first and second circuitry, configured to receive a control signal (*see* limitation 25[c]) and select between a MIMO mode “wherein both the first and second antennas transmit data” and a SIMO mode “wherein only one of the first and second antennas transmit data” (*see* limitation 25[d]). *Id.* at 31–36 (citing Ex. 1005 ¶¶ 1, 17, 19, 20, 24, 25, 27, 30, Fig. 2; Ex. 1002 ¶¶ 47–51, 99–108).

Petitioner illustrates Li’s mobile station in annotated Figure 2, reproduced below.



Pet. 34. Annotated Li Figure 2 illustrates a block diagram of a wireless device. *See* Ex. 1005 ¶ 3.

Petitioner annotates Li’s Figure 2 as device 200 (blue) representing mobile station STA 150 (not identified in Figure 2), including “transmitter circuitry 240a (green) that is ‘operatively coupled’ to first antenna 260 (yellow) and transmitter circuitry 240b (purple) that is ‘operably coupled’ to second antenna 270 (orange).” Pet. 29–30 (citing Ex. 1005 ¶¶ 21, 23, Fig. 2). Additionally, first antenna 260 is coupled to receiver 250a and second antenna is coupled to receiver 250b. Ex. 1005 ¶ 21. Petitioner further annotates Figure 2 as including “[m]edia Access Control (MAC) processor 210 (red)” that is a controller that “outputs a control signal to cause the system ‘to switch between a first operating mode’ and ‘a second operating mode,’ using switch 220 (teal).” Pet. 31–33 (citing Ex. 1005 ¶¶ 19, 24, 25, 27, 30, Fig. 2).

Patent Owner does not dispute that Li teaches the preamble and limitations 25[a]–25[d] of claim 25. *See* Prelim. Resp. 24–27. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that Li teaches the preamble¹⁴ and limitations 25[a]–25[d] of claim 25.

b) Limitations 25[e] and 25[f]: the control signal based on circuitry power consumption and idle power consumption

Claim 25 recites (25[e]) “wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry,” and

¹⁴ Because Petitioner has sufficiently shown that the prior art teaches the preamble, we need not determine at this time whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

(25[f]) “wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.” Ex. 1001, 19:16–20.

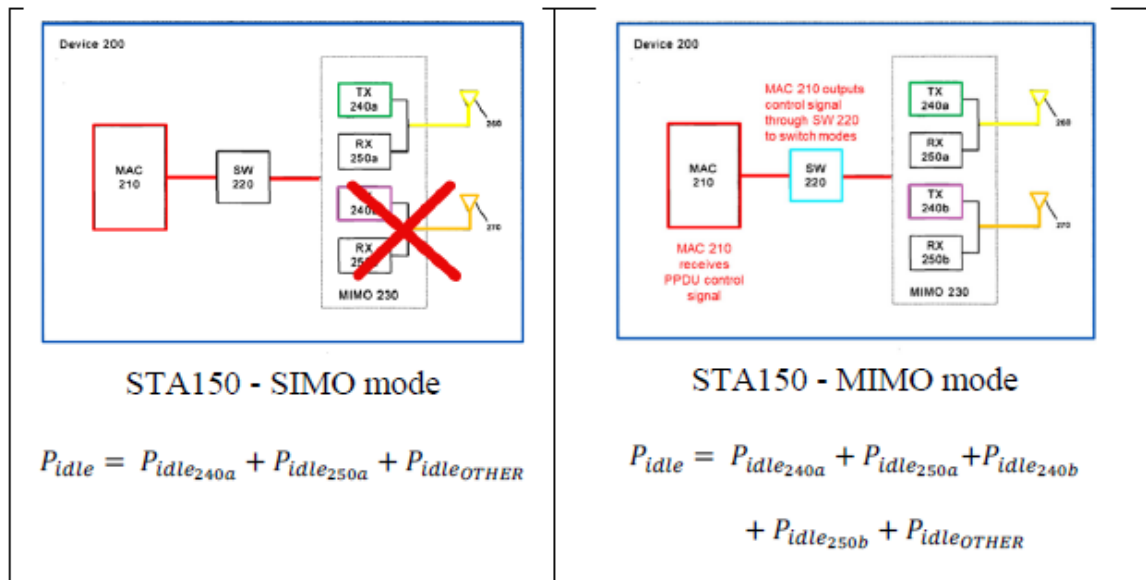
Petitioner asserts the combination of Li and Siam teaches or suggests the claimed control signal limitations. Pet. 36–43. Specifically, Petitioner asserts that “Siam expressly teaches consideration of transmitter circuit power during transmission including during the switch from SIMO to MIMO mode” (*id.* at 37) and “Li teaches that the control signal is based, at least in part, on an idle power consumption of the entire mobile station” (*id.* at 41). We consider each of these arguments in turn.

First, as to the control signal based on a power consumption of the first and second circuitry, Petitioner asserts “Siam teaches a protocol that explicitly selects between SIMO and MIMO (and SISO and MISO) transmission modes in a MIMO-capable wireless network based on consideration of both transmission power and circuit power.” Pet. 37–38 (citing Ex. 1006, 875–876). Petitioner further asserts “Siam’s protocol uses a multi-antenna link layer model” and provides an algorithm that incorporates the number of transmitter and receiver antennas, and transmission power and circuit power, whereby “circuit power . . . increases with each additional transmitter and receiver.” *Id.* at 38–39 (citing Ex. 1006, 876–877; Ex. 1002 ¶¶ 112–116). Petitioner cites Siam’s conclusion that “MIMO may not lead to the minimum total power consumption due to the large value of circuit power [A]t short distances, SISO is more power efficient than MIMO For intermediate distances, SIMO or MISO may be more power efficient.” *Id.* at 39 (citing Ex. 1006, 377) (emphasis omitted).

Second, as to the control signal based on idle power consumption of the mobile station, Petitioner asserts “Li teaches that ‘a station *in idle mode* waiting for incoming signals may consume approximately 60% of its battery

energy’ and that such idle power consumption is particularly a problem in MIMO configurations where multiple antennas and their associated circuitry are enabled.” *Id.* at 41 (citing Ex. 1005 ¶ 18). Petitioner further asserts one skilled in the art “would have recognized that the overall idle power consumption for the mobile station is the sum of all the transmit and receiver idle power consumption for each activated antenna in MIMO mode plus all of the control circuitry (e.g., MAC 210 and other control circuits).” *Id.* (citing Ex. 1002 ¶¶ 56, 120–122). Accordingly, Petitioner asserts that switching to SIMO mode would turn off Li’s idling transmitter circuit in the mobile station (assuming the receiver is off), so that the idling circuits no longer contribute to station idle power consumption. *Id.* (citing Ex. 1002 ¶ 122).

Petitioner illustrates the “difference in MIMO and SIMO station idle power” in the figure below.



Pet. 42. The annotated figure includes two side-by-side versions of Li’s mobile station in SIMO and MIMO mode, accompanied with Dr. Valenti’s equations for idle power consumption of each mode. *See* Ex. 1002 ¶ 122.

Li's mobile station in MIMO mode includes antenna 260 coupled to transmitter 240a and receiver 250a, and antenna 270 coupled to transmitter 240b and receiver 250b. Pet. 42. Petitioner illustrates Li's mobile station in SIMO mode by crossing-out (red X) antenna 270, transmitter 240b, and receiver 250b. *Id.* Petitioner argues "Li teaches that AP 110 may send a control signal to STA 150 to switch between SIMO and MIMO" thereby reducing power consumption of the mobile station and extending its battery life. *Id.* at 42–43 (citing Ex. 1005 ¶ 19; Ex. 1002 ¶¶ 122–124).

Patent Owner argues "Li **does not** teach **selecting** a SIMO or MIMO mode in accordance with a control signal based, at least in part, on power consumption of the circuitry or based, at least in part, on an idle power consumption of the device." Prelim. Resp. 25. "Instead, Li teaches that the base station requests that the device switch from a SISO or MISO operating mode to a SIMO or MIMO operating mode," but "does not specify that the selection is in accordance with a control signal based, at least in part, on power consumption of the circuitry or idle power consumption." *Id.* (citing Ex. 1005 ¶¶ 19–24). Patent Owner argues "Li does not provide any criteria to determine when mode switching should occur or identify the inputs used in determining mode switching." *Id.* (citing Ex. 1005 ¶¶ 24–25, 31).

Patent Owner further argues Petitioner does "not point to any disclosure of mode selection in Siam being in accordance with a control signal based, at least in part, on idle power consumption." *Id.* at 26. Patent Owner argues that, rather than discuss idle time, Siam's "references to variation in circuit power are based on transmitter-receiver **distance**." *Id.* at 26–27. Patent Owner also argues Petitioner conflates claim elements 25[e] and 25[f] by citing to Siam's algorithm for circuit power. *Id.* at 27 (citing Pet. 28–39, 42).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that the combination of Li and Siam teaches or suggests a control signal based, at least in part, on a power consumption of the first and second circuitry, and on an idle power consumption of the mobile station. As discussed above, Siam teaches a control signal based on power consumption of the first and second circuitry. *See* Ex. 1006, 875, 877. Although Siam’s power consumption varies due to distance, claim 25 does not specify how to evaluate the power consumption of the first and second circuitry. Patent Owner’s argument that Siam does not teach idle power consumption does not address Petitioner’s challenge, as Petitioner relies on Li, not Siam, for a control signal based on an idle power consumption of the mobile station.

As to idle power consumption, we find Li teaches that a mobile station in idle mode may consume approximately 60% of its battery energy—an inefficiency exacerbated by MIMO devices having more than one antenna turned on for reception. Ex. 1005 ¶ 18. Li further teaches addressing the power consumption problem by sending a control signal to switch operating modes by enabling operation of a desired number of receivers and transmitters, thereby reducing power consumption and extending battery life. *Id.* ¶ 19. Although Li teaches this in the context of a station “waiting for incoming signals,” we are persuaded by Petitioner’s argument that one skilled in the art “would have recognized that the overall idle power consumption for the mobile station is the sum of all the *transmit* and *receiver* idle power consumption for each activated antenna.” Pet. 41 (citing Ex. 1002 ¶¶ 56, 120–122) (emphasis added).

On this preliminary record, we agree with Petitioner that one of ordinary skill in the art “would have understood and been motivated to

configure Li's control signal for switching communication modes to also be based at least in part on overall circuit power consumption, and more precisely, on circuit power consumed while the mobile station is idle and not receiving or transmitting." *Id.* at 42–43 (citing Ex. 1002 ¶¶ 123–124).

c) Conclusion as to Claim 25

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 25 is unpatentable as obvious in view of Li and Siam.

5. Claims 27 and 28

Petitioner presents evidence that the combination of Li and Siam teaches the limitations of claims 27 and 28. Pet. 43–44. Patent Owner does not separately argue these claims at this stage of the proceeding. *See* Prelim. Resp. 28 (relying on the same arguments as to claim 25). Patent Owner may raise any arguments regarding these claims in its Patent Owner Response after institution. On the current record, Petitioner shows sufficiently that the combination of Li and Siam teaches the limitations of claims 27 and 28.

E. Asserted Obviousness of Claims 25, 27, and 28 over Li, Siam, and Cui-2003

Petitioner argues that claims 25, 27, and 28 would have been obvious over Li, Siam, and Cui-2003. Pet. 45–53. Patent Owner disputes Petitioner's contentions. Prelim. Resp. 28–34.

1. Cui-2003 (Ex. 1007)

Cui-2003 relates to "radio applications where the nodes operate on batteries so that energy consumption must be minimized while satisfying given throughput and delay requirements." Ex. 1007, 2805 (Abstr.). To this end, Cui-2003 analyzes "the best modulation strategy to minimize the total

energy consumption” including “both the transmission energy and the circuit energy consumption.” *Id.*

Cui-2003 assumes “that the transceiver circuitry works on a multimode basis: when there is a signal to transmit all circuits work in active mode, when there is no signal to transmit they work in sleep mode, and when switching from sleep mode to active mode there is a transient mode.” *Id.* at 2806. According to Cui-2003, “[t]he multi-mode operation provides a significant saving of energy when the sleep mode is deployed.” *Id.*

Cui-2003 describes the total energy consumption as consisting of the combined power consumption of the active mode, sleep mode, and transient mode. *Id.* “The active mode power P_{on} comprises the transmission signal power P_t and the circuit power consumption P_{co} in the whole signal path.” *Id.* “In the sleep mode, the power consumption is dominated by the leaking current I_l of the switching transistors if the circuitry is properly designed.” *Id.*

2. Reason to Combine Li, Siam, and Cui-2003

Petitioner asserts one skilled in the art “would have been motivated to combine Li-Siam and Cui-2003 (‘Li-Siam-Cui-2003’) and would have had a reasonable expectation of success in doing so.” Pet. 45. Petitioner argues all three references “describe systems that select an optimal data communication mode in a wireless communication system, from among SISO, MISO, SIMO, and MIMO modes, in order to reduce the total energy consumption of the system.” *Id.* (citing Ex. 1005 ¶¶ 18–19; Ex. 1006, 875; Ex. 1007, 2805; Ex. 1002 ¶¶ 130–132).

Petitioner asserts “Cui-2003 further improves the method for selecting the best transmission mode for ‘minimizing the total energy consumption’” by transitioning between active mode and sleep mode. *Id.* at 45–46 (citing

Ex. 1007, 2805, 2806; Ex. 1002 ¶ 133). Petitioner asserts one skilled in the art “would have been motivated to improve Li-Siam’s mode-switching system by adding Cui-2003’s express teaching that power consumption during sleep (i.e., idle) mode should be expressly considered in determining the most efficient modulation strategy.” *Id.* at 46 (citing Ex. 1002 ¶¶ 56, 134).

At this stage, Patent Owner does not dispute Petitioner’s reason to combine Li, Siam, and Cui-2003. On this record and for the purposes of institution, we are sufficiently persuaded by Petitioner’s argument and evidence that one skilled in the art would have been motivated to combine Li, Siam, and Cui-2003 and had a reasonable expectation of success in doing so.

3. *Analysis of Claim 25*

Petitioner asserts Li and Siam teach the preamble and limitations 25(a)–25(e) of claim 25. *See* Pet. 48–49. Petitioner cites Cui-2003 as teaching 25(f) “wherein the control signal is based, at least in part, on an idle power consumption of the mobile station.” *Id.* at 49–52.

Specifically, Petitioner asserts Cui-2003 teaches a “multi-mode operation” because “when there is a signal to transmit all circuits work in active mode, ***when there is no signal to transmit they work in sleep mode***, and when switching from sleep mode to active mode there is a transient mode.” *Id.* at 50 (citing Ex. 1007, 2806). According to Petitioner “[t]his ‘multi-mode operation’ allows significant energy to be saved when the sleep mode is used.” *Id.* (citing Ex. 1007, 2806; Ex. 1002 ¶¶ 145–146).

Petitioner further asserts one skilled in the art “would have understood that ‘sleep mode’ means a mode in which the mobile station is idle and not actively transmitting or receiving data but that mobile stations in sleep mode

may nevertheless continue to consume power since they are not completely shut down.” *Id.* at 51 (citing Ex. 1002 ¶¶ 56, 147). Petitioner concludes “Cui-2003 bases modulation selection, in part, on the idle power consumption of a wireless node,” and when combined with Li and Siam would have resulted in a control signal “based, at least in, on an idle power consumption of the mobile station.” *Id.* at 52 (citing Ex. 1002 ¶ 147).

Patent Owner argues Cui-2003 does not teach “a control signal ‘based, at least in part, on an idle power consumption of the mobile station.’” Prelim. Resp. 29. “Instead, Cui-2003 describes a ‘sleep mode.’” *Id.* Specifically, Patent Owner argues “Cui-2003 describes sleep mode as ‘where all the circuits in the signal path are **shut down** for energy saving.’” *Id.* at 30 (citing Ex. 1007, 2806). In contrast, Patent Owner argues that, according to the ’120 patent, “‘idle time’ and ‘idle power consumption’ refer to times when the circuitry of the device is powered on and waiting to transmit data over the communications channel.” *Id.* at 29 (citing Ex. 1001, 2:60–64, 3:3–5). By way of example, Patent Owner asserts Cui-2003 teaches negligible power consumption in sleep mode ($P_{sp} = 0$ due to leaking current $I_l \approx 0$) as compared to the ’120 patent in which “some idle power may be consumed due to leakage current or other effects.” *Id.* at 30, n. 8 (citing Ex. 1007, 2806; Ex. 1001, 3:5–7).

Patent Owner asserts one skilled in the art “would understand that Cui-2003’s sleep mode does not disclose the ’120 Patent’s idle mode, despite Petitioners’ assertion otherwise.” *Id.* at 33. Patent Owner further argues Petitioner’s “attempt to equate Cui-2003’s sleep mode with the ’120 Patent’s idle mode contradicts the teachings of the references, and a POSITA would understand that the power in sleep mode does not disclose

idle power consumption.” *Id.* Accordingly, Patent Owner argues Cui-2003 fails to teach idle power consumption.

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that the combination of Li, Siam, and Cui-2003 teaches a control signal based, at least in part, on an idle power consumption of the mobile station. As discussed above in the claim construction section (IV.C.1), on the current record, we do not read “idle power consumption” as requiring the circuitry to be powered on while “waiting to send data” or excluding circuitry that is powered off while waiting to send data. Instead, we preliminarily interpret “idle power consumption” as including power consumption during which the transceiver may be waiting to send data, whether the transceiver is on or off. Cui-2003 teaches a multi-mode operation that provides significant energy saving by placing the transceiver in sleep mode when the transceiver is waiting to send data. Ex. 1007, 2806 (“The transceiver spends time $T_{on} \leq T$ to communicate these bits, where T_{on} is a parameter to optimize, and then returns to the sleep mode where all the circuits in the signal path are shut down for energy saving.”).

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 25 is unpatentable as obvious in view of Li, Siam, and Cui-2003.

4. *Claims 27 and 28*

Petitioner presents evidence that the combination of Li, Siam, and Cui-2003 teaches the limitations of claims 27 and 28. Pet. 52–58. Patent Owner does not separately argue these claims at this stage of the proceeding. *See* Prelim. Resp. 34 (relying on the same arguments as to claim 25). Patent Owner may raise arguments regarding these claims in its Patent Owner

Response after institution. On the current record, Petitioner shows sufficiently that the combination of Li, Siam, and Cui-2003 teaches the limitations of claims 27 and 28.

F. Asserted Obviousness of Claim 26 over Li, Siam and Wu or over Li, Siam, Cui-2003, and Wu

Petitioner argues that claim 26 would have been obvious over Li, Siam, and Wu. Pet. 53–58. Petitioner identifies evidence indicating that the Li, Siam, and Wu combination teaches the limitations of claim 26 and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Alternatively, Petitioner argues that claim 26 would have been obvious over Li, Siam, Cui-2003, and Wu. *Id.* at 59. Petitioner identifies evidence indicating that the Li, Siam, Cui-2003, and Wu combination teaches the limitations of claim 26 and that a person of ordinary skill in the art would have had reason to combine these references. *Id.* Patent Owner does not raise any arguments relating to these asserted grounds. After a review of the record, we determine that Petitioner demonstrates a reasonable likelihood of prevailing in showing that claim 26 would have been obvious over Li, Siam, and Wu, or over Li, Siam, Cui-2003, and Wu.

G. Asserted Obviousness of Claim 29 over Li, Siam, and Tirola

Petitioner argues that claim 29 would have been obvious over Li, Siam, and Tirola. Pet. 59–68. Patent Owner disputes Petitioner’s contentions. Prelim. Resp. 35–40.

1. Tirola (Ex. 1008)

Tirola relates to uplink (“UL”) performance in mobile systems assuming different SIMO/MIMO (Single/Multiple Input Multiple Output) approaches. Ex. 1008, 657 (Abstr.). Tirola explains “[e]nhanced uplink

performance is crucial for reducing the [user equipment (UE)] transmission power requirements, especially for high data rate applications.” *Id.*

Tiirola discloses “[w]hen studying the UL performance of different transmission schemes, the UL load factor . . . plays an important role.” *Id.* at 658. The UL load factor is calculated by considering the ratio of other-cell to own-cell interference, the number of users, and the chip energy per total noise power density. *Id.* Tiirola discloses that noise increases along with the number of users. *See id.* at 659.

Tiirola concludes “MIMO transmission will provide some benefit (up to 2 dB) for UL coverage and UE battery consumption.” *Id.* at 657.

“However, doubling the number of receiving antennas is still much more efficient than introducing the 2nd transmit antenna at the UE. Based on this study the MIMO concept does not seem feasible for improving [Universal Mobile Telecommunications System (UMTS)] uplink performance.” *Id.*

2. Reason to Combine Li, Siam, and Tiirola

Petitioner asserts one skilled in the art “would have been motivated to combine Li-Siam and Tiirola’s teachings . . . and would have had a reasonable expectation of success in doing so, because all three describe systems that select an optimal data communication mode in a wireless communication system.” Pet. 59 (citing Ex. 1005 ¶¶ 18–19; Ex. 1006, 875; Ex. 1008, 657; Ex. 1002 ¶ 163). Petitioner argues the combination of Li and Siam “teaches or suggests a controller in a wireless communication system that switches between a MIMO and SIMO transmission mode based on a control signal that depends at least in part on circuit power consumption.” *Id.* at 59–60 (citing Ex. 1002 ¶¶ 163–164). Petitioner asserts “Tiirola considers the effect of multiple users on the noise level, which can degrade channel performance.” *Id.* at 60.

Petitioner further asserts Li teaches transmitting and receiving spread spectrum signals, such as Direct Sequence Spread Spectrum (DSSS), that “would be impacted by multiple users and would benefit from Tirola’s teachings for mitigating degradation caused by multiple users.” *Id.* at 60. More specifically, Petitioner asserts one skilled in the art “would have been motivated to implement Tirola’s teachings, which specifically consider the number of users of the communications system when selecting and/or switching between SIMO and MIMO modes, with Li’s system for at least its DSSS embodiments.” *Id.* at 61 (citing Ex. 1002 ¶ 165). According to Petitioner, one skilled in the art would have sought to optimize power consumption considering both circuit power consumption and the number of users. *Id.* at 62 (citing Ex. 1002 ¶¶ 54, 57–58, 165).

Petitioner adds that one skilled in the art “would have had a reasonable expectation of success in combining the teachings of Tirola with Li-Siam because they teach compatible systems—namely, electronic devices communicating in wireless communication systems using multiple antennas coupled to circuitry.” *Id.* at 62 (citing Ex. 1005 ¶¶ 18–25; Ex. 1006, 879–90; Ex. 1008, 657–58; Ex. 1002 ¶ 167). Petitioner asserts “[i]mplementing Tirola’s teachings to consider the number of users of the system in selecting and/or switching between a SIMO mode or MIMO mode in the Li-Siam system would have been straightforward, well within the capabilities of a POSITA.” *Id.* at 63 (citing Ex. 1002 ¶ 167).

Patent Owner disputes Petitioner’s reason to combine Li, Siam, and Tirola, and we address that argument in detail below.

3. *Analysis of Claim 29*

a) *Preamble and Limitations 29[a]–29[e]*

Independent claim 29 recites similar subject matter to claim 25, except the last limitation, 29(f), in which claim 29 recites a control signal based on a number of users rather than an idle power consumption (as in 25(f)). *See* Ex. 1001, 20:22–24. Accordingly, Petitioner applies the same teachings of Li and Siam to claim 29. *See* Pet. 63–64.

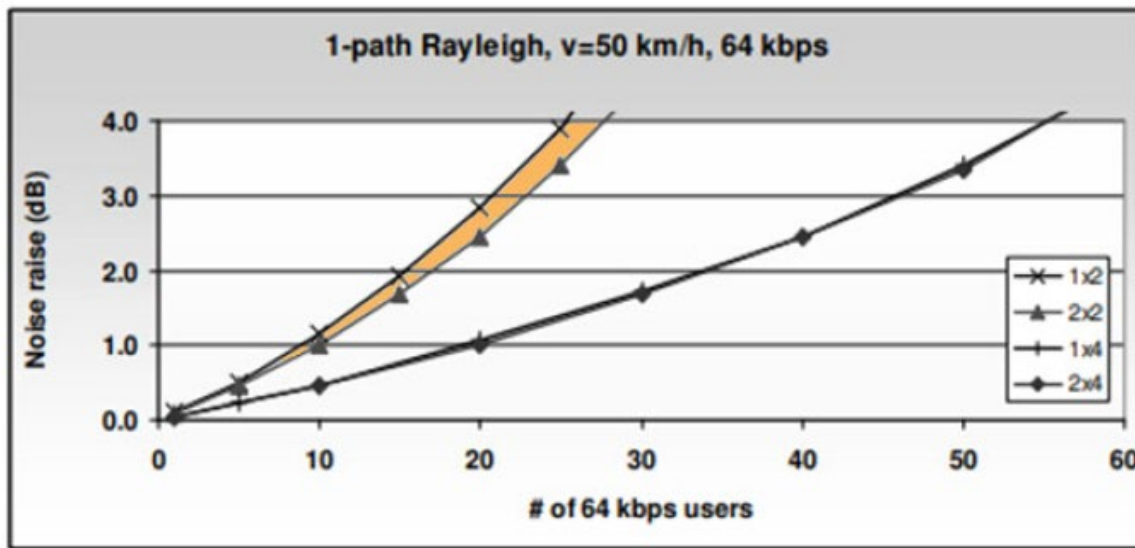
For example, Petitioner asserts that Li teaches or suggest a mobile station (*see* claim 29 preamble)¹⁵ including a first and a second antenna (*see* limitation 29[a]), and first and second circuitry coupled to the first and second antenna, configured to process signals for transmission by the first and second antenna, respectively (*see* limitation 29[b]). *Id.* (citing Pet. 27–31; Ex. 1002 ¶¶ 168–170). Petitioner further asserts that Li teaches or suggests a controller coupled to the first and second circuitry, configured to receive a control signal (*see* limitation 29[c]) and select between a MIMO mode “wherein both the first and second antennas transmit data” and a SIMO mode “wherein only one of the first and second antennas transmit data” (*see* limitation 29[d]). *Id.* at 64 (citing Pet. 31–36; Ex. 1002 ¶¶ 171–172). Finally, Petitioner asserts that Siam teaches “wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry” (*see* limitation 29[e]) *Id.* (citing Pet. 36–40; Ex. 1002 ¶ 173).

¹⁵ Because Petitioner has sufficiently shown that the prior art teaches the preamble, we need not determine at this time whether the preamble is limiting. *See Nidec*, 868 F.3d at 1017.

b) Limitation 29(f): control signal based on a number of users

Claim 29 recites (29[f]) “wherein the control signal is based, at least in part, on a number of users of the communications system.” Ex. 1001, 20:22–24.

Petitioner asserts “Tirola calculates and simulates the effects of the number of users on uplink performance.” Pet. 65–66 (citing Ex. 1008, 658; Ex. 1002 ¶¶ 176–177). Petitioner further asserts “Tirola also calculates the increase in noise from the UL load factor based on the number of users for various antenna configurations.” *Id.* at 66 (citing Ex. 1008, 658). Petitioner illustrates Tirola’s noise rise simulation in annotated Figure 4(b), reproduced below.



Pet. 67. Tirola’s Figure 4(b) is a chart showing noise raise (dB) as a function of number of users (# of 64 kbps users). Ex. 1008, 661.

Petitioner asserts Figure 4(b) “demonstrates that noise rise is larger for a 1×2 (SIMO) mode than for a 2×2 (MIMO) mode and the advantage of a MIMO mode increases with increasing number of users.” Pet. 66–67 (citing Ex. 1008, 659–61, Fig. 4(b)). Petitioner further asserts one skilled in the art “would have understood based on Tirola’s teachings that channel noise

considerations might favor, for example, a MIMO mode over a SIMO mode based on the noise increase in the presence of a large number of users.” *Id.* at 67 (citing Ex. 1002 ¶ 179). Combining Tirola’s teachings with Li and Siam’s teachings about circuit power, Petitioner argues one of ordinary skill in the art “would have understood that there could be a crossover point in Figure 4(b) such that consideration of both the power consumption and the number of users of the system might lead the system to choose a SIMO mode over a MIMO mode.” *Id.* (citing Ex. 1002 ¶¶ 54, 57–58, 179–180).

Patent Owner presents two arguments against Petitioner’s combination of Li, Siam, and Tirola. First, Patent Owner argues one skilled in the art “would not have combined Li-Siam with Tirola because Tirola teaches away from using MIMO.” Prelim. Resp. 35–38. Second, Patent Owner argues Tirola does not disclose a control signal based on a number of users. *Id.* at 38–40. We consider these arguments below.

(1) Whether Tirola Teaches Away

“Prior art teaches away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant.” *Arctic Cat Inc. v. Bombardier Recreational Prod. Inc.*, 876 F.3d 1350, 1360 (Fed. Cir. 2017). Patent Owner argues Tirola discourages combination with Li’s MIMO system by concluding that “the **MIMO** concept *does not seem feasible for improving* UMTS . . . uplink performance.” Prelim. Resp. 36 (citing Ex. 1008, 657). Accordingly, Patent Owner argues “it would have been counterintuitive to combine Li-Siam’s mode-switching with Tirola in view of Tirola’s *express disparagement of MIMO*.” *Id.* (citing Pet. 63). Patent Owner further argues Tirola does not

recognize any value of diversity gains from MIMO technology, unlike Li and Siam. *See id.* at 36–37 (citing Ex. 1006, 875; Ex. 1008, 660, 657).

We are not persuaded on this preliminary record that Tirola teaches away the combination with Li and Siam. Rather, we find Tirola contains statements both suggesting the combination and potentially disparaging it. *See Medichem, S.A. v. Rolabo S.L.*, 437 F.3d 1157, 1165 (Fed. Cir. 2006) (“[A] given course of action often has simultaneous advantages and disadvantages, and this does not necessarily obviate motivation to combine.”). Contrary to Patent Owner’s argument that Petitioner ignores this issue (*see* Prelim. Resp. 37), Petitioner acknowledges “the advantage of a MIMO mode diminishes when the base station uses four antennas instead of two antennas” (Pet. 66 (citing Ex. 1008, 659–60; Ex. 1002 ¶ 178)).

Despite the diminishing advantage, Dr. Valenti testifies that at least in certain situations, “it would generally be preferable to pick the 2-by-2 MIMO mode over the 1-by-2 SIMO mode because the 2-by-2 MIMO mode’s noise rise curve is below that of the 1-by-2 SIMO mode,” whereby a person of ordinary skill in the would have been motivated to implement Tirola’s teachings into the Li and Siam combination. *See* Ex. 1002 ¶¶ 178–182. Considering Tirola’s teachings as a whole, we find Petitioner establishes a reasonable likelihood of combining the references, but Patent Owner identifies an issue to be further explored at trial as to the reason to combine. *See Artic Cat*, 876 F.3d at 1361 (“Once all relevant facts are found, the ultimate legal determination involves the weighing of the fact findings to conclude whether the claimed combination would have been obvious to an ordinary artisan.”).

(2) *Whether Tirola Teaches a Number of Users*

Apart from arguing against combining the references, Patent Owner argues Tirola does not teach “the ‘number of users’ limitation.” Prelim. Resp. 38. Instead, Patent Owner argues “Tirola merely describes a simulation in which signal noise increases in SIMO and MIMO transmission modes as the number of users increase.” *Id.* (citing Ex. 1008, 659, 661). Patent Owner argues Tirola’s simulations show mixed results, including approximately equal noise rise in “a 1×2 (SIMO) mode and 2×2 (MIMO) mode, or even that noise rise is greater for the MIMO mode than the SIMO mode.” *Id.* at 38–39 (citing Ex. 1008, 661). Patent Owner further argues Tirola’s equations “have no application with respect to transmission mode selection in a mobile device,” because “Tirola does not teach transmission mode selection at all.” *Id.* at 40. “Instead Tirola teaches away from transmitting in MIMO because ‘the MIMO concept does not seem feasible for improving UMTS uplink performance.’” *Id.* (citing Ex. 1008, 657).

We determine that, on this record, Petitioner establishes sufficiently for the purposes of institution that the combination of Li, Siam, and Tirola teaches or suggests a control signal based, at least in part, on a power consumption of the first and second circuitry and a number of users of the communication system. Petitioner cites Li and Siam for teaching a control signal to select between SIMO and MIMO transmitting modes. *See* Pet. 64, 33–36. Contrary to Patent Owner’s argument, Petitioner does not rely on Tirola to teach a control signal for switching between modes. Instead, Petitioner cites Tirola to further incorporate the number of users into the SIMO vs. MIMO determination due to channel noise considerations. *See id.* at 67 (“consideration of both the power consumption and the number of users of the system might lead the system to choose a SIMO mode over a

MIMO mode”). We find these teachings, and those cited above, establish a reasonable likelihood the combination of Li, Siam, and Tirola teaches or suggest the control signal, based, at least in part, on a number of users of the communications system.

c) Conclusion as to Claim 29

Based on the current record, there is a reasonable likelihood that Petitioner will prevail in demonstrating that claim 29 is unpatentable as obvious in view of Li, Siam, and Tirola.

V. CONCLUSION

For the forgoing reasons, Petitioner has demonstrated a reasonable likelihood that at least one challenged claim of the ’120 patent would have been obvious over the prior art of record. Accordingly, we institute an *inter partes* review on claims 25–29 for all grounds set forth in the Petition.

VI. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that, pursuant to 35 U.S.C. § 314, an *inter partes* review is instituted on claims 25–29 for all grounds set forth in the Petition; and

FURTHER ORDERED that, pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, *inter partes* review of the ’120 patent shall commence on the entry date of this Order, and notice is hereby given of the institution of a trial.

IPR2024-00896
Patent 8,798,120 B2

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