

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG ELECTRONICS CO., LTD.,
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioners,

v.

EMPIRE TECHNOLOGY DEVELOPMENT LLC,
Patent Owner.

Case No. IPR2024-00896
U.S. Patent No. 8,798,120

PATENT OWNER'S PRELIMINARY RESPONSE

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Ex-2002	Assignment and Assumption Agreement
Ex-2003	Amendment No. 2 to Master License Agreement
Ex-2004	U.S. Patent No. 8,081,698 (“Xu”)
Ex-2005	U.S. Patent App. Pub. No. US 2002/0056066 A1 (“Gesbert”)
Ex-2006	Docket Control Order, <i>Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.</i> , 2:23-cv-00427, ECF No. 25 (E.D. Tex. Feb. 5, 2024)
Ex-2007	<i>United States District Court—National Judicial Caseload Profile</i> , UNITED STATES COURTS (Dec. 31, 2023), https://www.uscourts.gov/sites/default/files/fcms_na_distprofile1231.2023_0.pdf .
Ex-2008	Defendants’ Patent Local Rule 3-3 Disclosure of Invalidity Contentions and Subject Matter Eligibility Contentions, <i>Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.</i> , 2:23-cv-00427, ECF No. 25 (E.D. Tex. Mar. 29, 2024)
Ex-2009	Katherine K. Vidal, <i>Memorandum re Interim Procedure for Discretionary Denials</i> , UNITED STATES PATENT AND TRADEMARK OFFICE (June 21, 2022), https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_2022_0621_.pdf .

I. INTRODUCTION

Empire Technology Development, LLC (“Patent Owner”) submits this Preliminary Response to Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.’s (collectively, “Petitioners”) Petition challenging claims 25-29 of U.S. Patent No. 8,798,120 (the “’120 Patent”).

The Board should deny institution of this Petition for both substantive and discretionary reasons. The Board should deny the Petition on the merits because Petitioners have not established a reasonable likelihood that they will prevail on any of the five grounds. Specifically, Petitioners have failed to demonstrate a reasonable likelihood of unpatentability because none of the art asserted in the Petition discloses the “idle power consumption” or “number of users” limitations that were named by the Examiner as the reasons for patentability of independent claims 25 and 29, respectively.

Furthermore, the Board should exercise its discretion to deny the Petition under 35 U.S.C. §§ 314(a) and 325(d). Petitioners present substantially the same art and arguments that were previously presented to the Examiner and assert the same art against the ’120 Patent in the parallel district court proceeding. Additionally, all six *Fintiv* factors weigh in favor of discretionary denial. Therefore, institution of this Petition would be an inefficient use of Board resources, and the Board may properly exercise its discretion to deny institution.

II. BACKGROUND

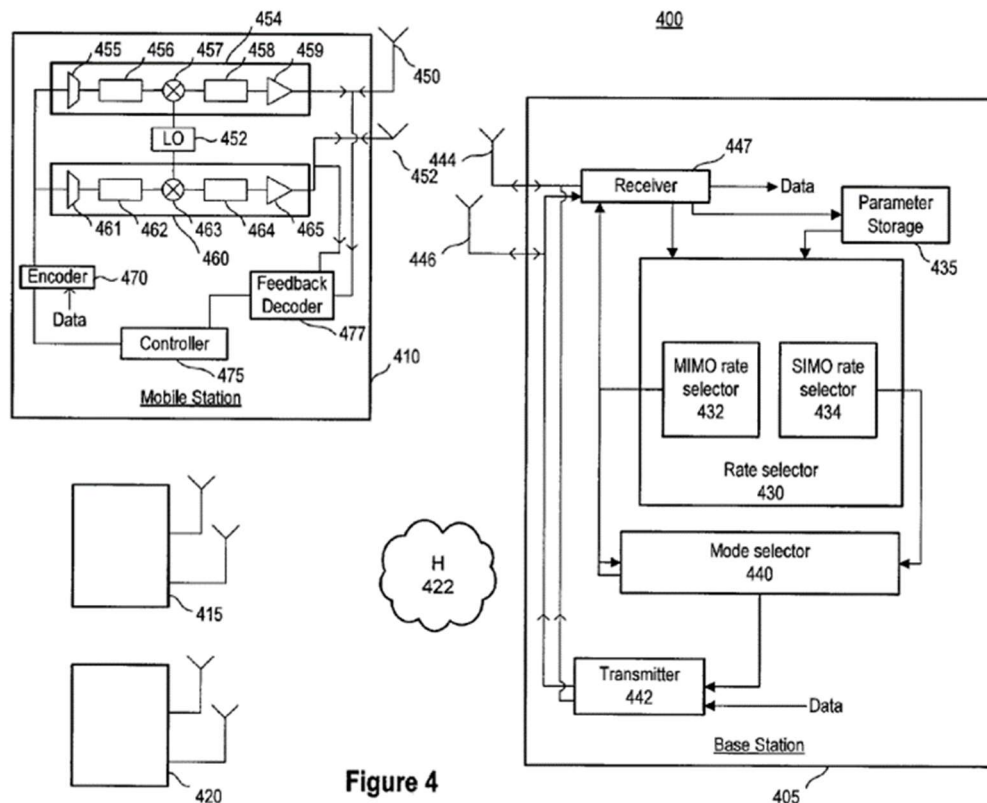
A. Overview of the '120 Patent

The '120 Patent is directed to “Methods and Communication Systems Having Adaptive Mode Selection.” Ex-1001. The '120 Patent concerns “methods, systems, devices, and/or apparatus generally related to selecting a transmit mode in a communications system.” *Id.* at 2:12-14. Two transmit modes are multiple-input multiple-output mode (“MIMO”) and single-input multiple-output mode (“SIMO”). *Id.* at 2:37-39.

Through the use of multiple transmit antennas and multiple receive antennas, MIMO communication systems communicate data symbols over a communications system. By allowing a plurality of receivers to use the same frequency band, MIMO systems “advantageously increase an amount of data the communication systems are able to send to users.” *Id.* at 1:18-24. SIMO systems, on the other hand, employ a single transmit antenna and one or more receive antennas to communicate data symbols. *Id.* at 1:25-28.

MIMO and SIMO systems can, among other applications, be used in the wireless networks found in smartphones and smart tablets, among other devices. These networks include, *e.g.*, “3G and 4G systems, such as 3GPP LTE-Advanced, local and wide-area networks.” *Id.* at 1:31-32.

Figure 4 of the '120 Patent, below, depicts an example of the disclosed communications system. As stated in the specification, Figure 4 depicts “a schematic illustration of some example communications systems arranged in accordance with at least some examples of the present disclosure.” *Id.* at 7:1-3. Figure 4 depicts a base station 405, configured to communicate with mobile stations 410, 415, and 420 over the communications channel. *Id.* at 7:4-8. While Figure 4 depicts only three mobile stations, the base station may communicate with any number of mobile stations. *Id.* at 7:44-46. These “mobile stations” can be any number of devices, including but not limited to cell phones, laptop computers, desktop computers, and personal digital assistants. *Id.* at 10:52-57.



The '120 Patent further explains this figure as follows:

The mobile station 410 may include two antennas 450 and 452. First circuitry 454 is coupled to the antenna 450 and configured to process signals for transmission by the antenna 450. The first circuitry may include a digital-to-analog converter 455, a filter 456, a mixer 457, a filter 458, and a power amplifier 459. Second circuitry 460 may be coupled to the antenna 452 and configured to process signals for transmission by the antenna 452. The second circuitry 460 may also include a digital-to-analog converter 461, a filter 462, a mixer 463, a filter 464, and a power amplifier 465. ... An encoder 470 may be coupled to the first and second circuitry. A controller 475 may be coupled to the encoder 470 and configured to provide a signal to the encoder 470 to operate in a MIMO mode or a SIMO mode.

Id. at 7:17-33.

The '120 Patent discloses several parameters that may be stored in parameter storage 435 including, but not limited to, data associated with power consumption of the mobile stations at an idle time or indicating a number of users of the communications system 400. *Id.* at 8:47-55, 9:20-23. For example, by using idle power consumption as a parameter, the '120 Patent accounts for power consumption during an idle time, which, *e.g.*, may be the “time during which the transceiver may be waiting to send data over the communications channel.” *Id.* at 2:60-62. With the circuitry powered on but still awaiting a signal, idling transceivers may continue to

consume power. As explained in the '120 Patent: "Even if the idling transceivers turn off their transmission chains, some idle power may be consumed due to leakage current or other effects." *Id.* at 3:5-7. As an alternative to storing information related to power consumption, "a signal indicative of the power consumption during an idle time may be provided." *Id.* at 8:58-62. As another example, "a default value may be stored and may be updated by a communication from the mobile station." *Id.* at 8:63-65.

Another disclosed parameter is the number of users of the communications system. The parameter storage may provide "a signal indicative of the number of users." *Id.* at 9:22-23.

Independent claim 25 of the '120 Patent reads as follows:

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 couple 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 a mobile station.

Id. at 19:1-20.

Independent claim 29 of the '120 Patent reads as follows:

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 couple 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 20:3-25.

B. Prosecution History of the '120 Patent

During examination of the '120 Patent, the Examiner expressly recognized that the limitations regarding consideration of idle power consumption and the number of users during mode selection were distinct from past methods in the prior art. Ex-1004 at 189.

Issued claim 25 is independent and appeared in the original patent application as claim 27, while issued claims 26-28 are dependent and appeared in the original patent application as claims 30, 31, and 33, respectively. *Id.* at 31-32. The “idle power consumption” limitation of claim 25 was originally included in another dependent claim (claim 32). *Id.* at 31-32. Issued claim 29 appeared in the original application as dependent claim 29, reading simply “the mobile station of claim [25], wherein the control signal is based, at last [sic] in part, on a number of users of the communications system.” *Id.* at 32.

On October 15, 2012, the Examiner rejected claims 27, 28, 31, and 32 as unpatentable over (1) U.S. Patent No. 8,081,698 (“Xu”) in view of (2) “Energy-

efficiency of MIMO and cooperative MIMO Techniques in Sensor Networks” by Cui, et al. (“Cui-2004”). *Id.* at 94.

Original claims 29 and 32 were objected to as being dependent upon a rejected base claim, but were deemed “allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.” *Id.* at 100. With respect to claim 29, the Examiner stated that “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.” *Id.* With respect to application claim 32, now a limitation of issued claim 25, the Examiner stated, “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.” *Id.*

On December 10, 2012, the applicant and Examiner conducted a telephone interview in which a possible amendment was discussed. *Id.* at 118. According to the summary of the interview, the applicant and Examiner agreed that Xu would not be applicable to amended claims that “explicitly state that the power consumption is with regards to the physical transceiver circuitry.” *Id.*

On January 14, 2013, the applicant amended application claim 27 to add “wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry.” *Id.* at 125. The applicant argued that “Xu and Cui,

individually or in combination, do not disclose or suggest the combination of elements of claim 27.” *Id.* at 130.

On April 10, 2013, the Examiner rejected claim 27 as being unpatentable over Xu in view of Cui-2004 and U.S. Patent No. 8,140,023 (“Bougard”). *Id.* at 147. According to the Examiner, Bougard “discloses wherein the control signal is based, at least in part, on a power consumption of the first and second circuitry.” *Id.* at 149 (citations omitted). The Examiner again provided the same statement of reasons for allowable subject matter with respect to claims 29 and 32. *Id.* at 153.

On June 28, 2013, the applicant amended claim 27 to add the limitation from application claim 32 that the control signal for the claimed communications system “is based, at least in part, on an idle power consumption of the mobile station.” *Id.* at 173. In addition, applicant converted claim 29 into an independent claim. *Id.*

On March 20, 2014, the Examiner issued a notice of allowance and stated that, regarding claim 27, “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.” *Id.* at 189. With respect to claim 29, the Examiner stated that “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 mode selection determination.” *Id.*

C. Related District Court Litigation

Currently, there is pending district court litigation between Petitioners and Patent Owner in the Eastern District of Texas in the matter captioned *Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.*, 2:23-cv-00427 (E.D. Tex. Sept. 18, 2023). In that action, Patent Owner contends that Petitioners infringe at least claims 25 and 29 of the '120 Patent under 35 U.S.C. § 271.

III. LEVEL OF ORDINARY SKILL IN THE ART

Petitioners offer a definition of a person of ordinary skill in the art (“POSITA”) at the relevant time as one who 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, with additional education substituting for experience and vice versa.” Pet. at 8. For purposes of this proceeding, Patent Owner does not challenge this definition.

IV. CLAIM CONSTRUCTION

Claim construction proceedings have not begun in the above-mentioned district court litigation. At present, Patent Owner submits that all claim terms should be given their plain and ordinary meaning as understood by a POSITA in light of the specification and the prosecution history pertaining to the '120 Patent and no claim

terms in the '120 Patent require an express construction. 37 C.F.R. § 42.100(b); *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312-13 (Fed. Cir. 2015) (en banc); *see also* 83 Fed. Reg. 51,340 (Oct. 11, 2018). Likewise, Petitioners “do[] not believe that any term requires construction.” Pet. at 9. Patent Owner reserves all rights with respect to claim construction in the district court litigation and in this proceeding.

V. THE BOARD SHOULD EXERCISE ITS DISCRETION AND DENY INSTITUTION UNDER § 325(d).

35 U.S.C. § 325(d) permits the Board, on behalf of the Director, to deny institution of IPR petitions because “the same or substantially the same prior art or arguments previously were presented to the Office.” 35 U.S.C. § 325(d); *see Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, No. IPR2019-01469, Paper 6 at 7 (P.T.A.B. Feb. 13, 2020). The Board uses a two-part framework in considering whether to exercise discretion under § 325(d), which is informed by the factors enumerated in *Becton, Dickinson*.¹ *Advanced Bionics*, No.

¹ The *Becton, Dickinson* factors include “(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; (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection; (d) the extent of the overlap between

IPR2019-01469, Paper 6 at 8-9 (citing *Becton, Dickinson & Co. v. B. Braun Melsungen AG*, No. IPR2017-01586, Paper 8 at 17-18 (P.T.A.B. Dec. 15, 2017)).

First, the Board considers whether the same or substantially the same art or arguments were previously presented to the Office. *Id.* “Previously presented art includes art made of record by the Examiner, and art provided to the Office by an applicant, such as on an Information Disclosure Statement (IDS), in the prosecution history of the challenged patent.” *Id.* at 7-8. Even if a submitted reference is not substantively discussed during prosecution, it “nonetheless qualifies as prior art previously presented to the Office.” *Fitesa Simpsonville, Inc. v. Procter & Gamble Co.*, No. IPR2023-01450, Paper 11 at 12 (P.T.A.B. Mar. 20, 2024).

the arguments made during examination and the manner in which petitioner relies on the prior art; (e) whether petitioner has pointed out sufficiently how the examiner erred in its evaluation of the asserted prior art; and (f) the extent to which additional evidence and facts presented in the petition warrant reconsideration of the prior art or arguments.” *Advanced Bionics*, IPR2019-01469, Paper 6 at 9 n.10 (citing *Becton, Dickinson*, IPR2017-01586, Paper 8 at 17-18). Factors (a), (b) and (d) are relevant to the analysis under the first prong of the *Advanced Bionics* framework, and factors (c), (e) and (f) are relevant to the analysis under the second prong. *Id.* at 10.

Second, if either condition of the first part of the framework is satisfied, the Board considers whether the petitioner “demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Advanced Bionics*, No. IPR2019-01469, Paper 6 at 8. “If a condition in the first part of the framework is satisfied and the petitioner fails to make a showing of material error, the Director generally will exercise discretion not to institute *inter partes* review.” *Id.* at 8-9.

Here, the Board should exercise its discretion under § 325(d) and deny institution because both prongs of the *Advanced Bionics* framework are met. With respect to the first prong, Petitioners only ***stated***, without more, that Li, Siam, Wu, and Tirola are not of record and ***failed to conduct any analysis*** as to whether any of those asserted references are cumulative of art previously presented to the Office, which is, “by itself, fatal under *AB* part one.” *Parse Biosciences, Inc. v. 10X Genomics, Inc.*, No. IPR2023-01033, Paper 8 at 14 (P.T.A.B. Dec. 19, 2023) (quoting petition that only stated one reference “was not considered by the Examiner at all during prosecution”). Regarding the second prong, Petitioners also did not address whether the Examiner materially erred in finding the challenged claims patentable, despite the Board’s clear direction that “Petitioners are expected to address all material issues relevant to institution of trial in their petitions, including discretionary factors [related to § 325(d)] that could be case dispositive.” *Regeneron*

Pharms., Inc. v. Novartis Pharma AG, No. IPR2020-01317, Paper 14 at 5 (P.T.A.B. Nov. 17, 2020).

Moreover, each of Petitioners' asserted references are cumulative of art considered by the Examiner during prosecution, particularly because they fail to disclose the "idle power consumption" and "number of users" limitations expressly identified by the Examiner as the reasons for allowance. *Cf. Magellan Midstream Partners L.P. v. Sunoco Partners Mktg. & Terminals L.P.*, No. IPR2019-00024, Paper 9 at 34-35 (P.T.A.B. Apr. 8, 2019) (considering whether the identified prior art "fails to disclose or suggest the limitations identified by the Examiner in his reasons for allowance"); *Meta Platforms, Inc. v. Mobile Data Techs. LLC*, No. IPR2024-00251, Paper 11 at 18 (P.T.A.B. June 11, 2024) (concentrating § 325(d) analysis on whether asserted references disclosed the limitations "highlighted in the Notice of Allowance"). Specifically, all of Petitioners' asserted references are cumulative of Xu, Cui-2004, "Energy-Constrained Modulation Optimization" by Cui et al. ("Cui-2005"), Bougard, and U.S. Patent App. Pub. No. US 2002/0056066 A1 ("Gesbert"), which were references of record during the prosecution of the '120 Patent. *See* Ex-1001 at 1; Ex-1004 at 105 (IDS with Examiner's initials confirming consideration), 94-99, 147-53 (Examiner's remarks regarding the prior art). The *Advanced Bionics* framework is met for each of Petitioners' asserted references, as explained below.

A. Li and Siam

Petitioners rely on Li and Siam in each of their asserted obviousness grounds. But Li and Siam are cumulative over the art considered during the prosecution of the '120 Patent. Specifically, in response to a rejection of issued claims 25, 27, and 28 as obvious over Xu, Cui-2004, and Bougard, the applicant amended claim 25 to add the limitation that “the control signal is based, at least in part, on an idle power consumption of the mobile station.” Ex-1004 at 147-49, 172-73. With 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.” *Id.* at 189. Like 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, as explained further *infra* Section VI.A.i. Therefore, Li and Siam are substantially the same as, and cumulative over, the prior art of record.

Specifically, Li does not disclose the “idle power consumption” limitation that was the reason for allowance of issued claim 25. Li notes that “[o]ne problem associated with wireless communication devices” is the inefficient use of power when in “idle mode.” Ex-1005 ¶ 18. But Li does not teach selecting SIMO or MIMO in accordance with a control signal based, at least in part, on an idle power

consumption of the device, as recited in '120 Patent claim 25. Instead, Li's disclosure of switching from a SISO or MISO operating mode to a SIMO or MIMO operating mode, *e.g.*, Ex-1005 ¶¶ 19-24, is substantially the same as that in Xu:

Method 300 can facilitate transmitting a request from base station (*e.g.*, an enhanced Node base station, eNode B, access point (AP) or like mechanism) to one or more terminal devices (*e.g.* user equipment, UE, AT, or like mechanism) [in] a wireless communication network. ... If the requested data rate is above a SIMO threshold, then method moves to 306, otherwise, the method move[s] to the end and terminates. At 306, if the UE is using OFDM-MIMO transmission mode, then the method moves to the end and terminates. Otherwise, the method moves to 308 to transmit an indication to the terminal to switch to using OFDM-MIMO transmission. The indication maybe transmitted using an existing communication link between UE and AP or set up a specific communication link to provide the indication.

Ex-2004 at 8:18-44. The Examiner specifically cited this passage of Xu and 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.” Ex-1004 at 148, 153. Thus, Li is cumulative of at least Xu, and the first prong of the *Advanced Bionics* framework is met with respect to Li.

Similarly, Siam does not mention “idle power consumption” or an equivalent feature. *See* Ex-1006. Petitioners argue that Siam “teaches an algorithm that expressly takes circuit power into account when selecting between a SIMO and

MIMO mode.” Pet. at 42; *see also* Pet. at 38-40. But Siam merely applies known techniques for joint optimization of transmission and circuit powers *taught in Cui-2004 and Cui-2005* and applies them to LAN networks:

[I]t was shown in [Cui-2004]² that MIMO-based transmission consumes much less transmission power than SISO-based transmission for the same throughput. ... a distance-dependent tradeoff emerges between transmission and circuit powers [Cui-2005]³; for relatively small distances, circuit power is dominant, and hence a SISO mode is more energy-efficient than a multi-antenna transmission mode. As the transmitter-receiver separation increases, the tradeoff shifts in favor of multi-antenna modes (SIMO, MISO, or MIMO). Joint optimization of transmission/ circuit powers was considered in several previous studies (e.g., [Cui-2005]), although the focus has been on SISO systems. The authors in [Cui-2004] proposed a joint energy minimization strategy for MIMO-based systems, but only for a single link under a fixed MIMO strategy.

Ex-1006 at 875-76. Therefore, Siam is cumulative of Cui-2004 and Cui-2005, which the Examiner considered during prosecution and found did not disclose the “idle

² Cui-2004 is listed as reference “[4]” in the References section of Siam. Ex-1006 at 880.

³ Cui-2005 is listed as reference “[5]” in the References section of Siam. *Id.*

power consumption” limitation. *See* Ex-1004 at 189. The first prong of the *Advanced Bionics* framework is also met with respect to Siam.

Additionally, Petitioners rely on Li and Siam to argue that the “idle power consumption” limitation is obvious (though Siam does not mention “idle power consumption”), but this is substantially the same argument that the Examiner considered and rejected when allowing claim 25 because the prior art did not disclose or render obvious the “idle power consumption” limitation. *See id.* at 189. Thus, Petitioners present substantially the same arguments, as well as substantially the same art, that were previously considered by the Office.

Turning to the second prong of the *Advanced Bionics* framework, Petitioners have not asserted that the Examiner materially erred in finding the challenged claims patentable over Xu, Cui-2004, and Cui-2005, as explained further *infra* Section V.B. Therefore, the *Advanced Bionics* framework is satisfied with respect to Li and Siam.

B. Cui-2003

Petitioners rely on Cui-2003's disclosure of “sleep mode” for purposes of the “idle power consumption” limitation in claim 25. Pet. at 49-52. But Cui-2003's disclosure of “sleep mode” is nearly identical to that in Cui-2005, and substantially the same as Cui-2004, both of which were considered during prosecution.

Petitioners do not deny that Cui-2003 is substantially the same as Cui-2005.⁴ See Pet. at 22 n.6 (noting that Cui-2004 and Cui-2005 were references of record during prosecution and asserting that Cui-2003 is not cumulative of only Cui-2004). Nor could they, because the relied upon disclosures in Cui-2003 for the idle power consumption limitation are nearly identical to the disclosures in Cui-2005, as shown in the table below.

Relied Upon Disclosures in Cui-2003	Disclosures in Cui-2005
“Cui-2003 ‘assume[s] that the transceiver circuitry works on a multimode basis: when there is a signal to transmit all circuits work in active mode, <i>when there is no signal to transmit they work in sleep mode</i> , and when switching from sleep mode to active mode there is a transient mode.’ Ex-1007, 2806. This ‘multi-mode operation’ allows significant energy to be saved when the sleep mode is used. Ex-1007, 2806; Ex-1002 ¶¶145-146.” Pet. at 50.	“It is assumed that the transceiver circuitry works on a multi-mode basis: When there is a signal to transmit, all circuits work in the active mode, <i>when there is no signal to transmit they work in the sleep mode</i> , and when switching from sleep mode to active mode, there is a transient mode. The multimode operation provides a significant savings of energy when the sleep mode is deployed.” Ex-1025 at 2350 (emphasis added).

⁴ Petitioners argue that Cui-2005 being cumulative of Cui-2003 is not sufficient to satisfy the first *Advanced Bionics* prong because it is the third reference in Grounds 2 and 4. Cf. Petition at 22. But Petitioners fail to offer any analysis under the *Advanced Bionics* framework for any of the other asserted references, and as described herein, all of the asserted references are cumulative of art previously presented to the Office.

“Cui-2003 further teaches that ‘the total energy consumption E required to send L bits’ has three components: $E = P_{on}T_{on} + P_{sp}T_{sp} + P_{tr}T_{tr}$ $= (P_t + P_{c0})T_{on} + P_{sp}T_{sp} + P_{tr}T_{tr},$ ‘where P_{on}, P_{sp}, and P_{tr} are power consumption values for the active mode, the sleep mode, and the transient mode, respectively.’” Pet. at 51.	“Correspondingly, the total energy consumption E required to send L bits also consists of three components $E = P_{on}T_{on} + P_{sp}T_{sp} + P_{tr}T_{tr}$ $= (P_t + P_{c0})T_{on} + P_{sp}T_{sp} + P_{tr}T_{tr}$ where P_{on}, P_{sp}, and P_{tr} are power consumption values for the active mode, the sleep mode, and the transient mode, respectively.” Ex-1025 at 2350-51.
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Furthermore, Petitioners claim that Cui-2004 “is not cumulative of Cui-2003 because it does not teach idle power consumption.” Pet. at 22 n.6. Although neither teaches idle power consumption, both Cui-2003 and Cui-2004 discuss “sleep mode,” as shown in the table below. In fact, Cui-2004 cites to Cui-2003 in its discussion thereof. Ex-1026 at 1092, 1097.

Disclosures in Cui-2003	Disclosures in Cui-2004
“The multi-mode operation provides a significant saving of energy when the sleep mode is deployed.” Ex-1007 at 2806.	“It has been shown in [Cui-2003]⁵ that the optimal strategy to minimize the total energy consumption is to operate on a multimode basis, which provides a significant savings of energy when the sleep mode is deployed.” Ex-1026 at 1092.
“The transceiver spends time $T_{on} \leq T$ to communicate these bits, where T_{on} is a parameter to optimize, and then	“The transceiver spends time $T_{on} \leq T$ to communicate these bits, where T_{on} is a parameter to optimize, and then

⁵ Cui-2003 is listed as reference “[4]” in the References section of Cui-2004. Ex-1026 at 1097.

<i>returns to the sleep mode where all the circuits in the signal path are shut down for energy saving.”</i> Ex-1007 at 2806 (emphasis added).	<i>returns to the sleep mode where all the circuits in the signal path are shut down to save energy.”</i> Ex-1026 at 1092 (emphasis added).
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These excerpts demonstrate that Cui-2003 is cumulative of Cui-2004.⁶ Moreover, Cui-2004 was discussed at length in the initial rejection of issued claim 25 for obviousness, so Cui-2004 was undoubtedly considered during prosecution. *E.g.*, Ex-1004 at 94-97, 147-150. Thus, Cui-2003 is substantially the same as Cui-2004 and Cui-2005, and the first *Advanced Bionics* prong is satisfied.

Turning to the second prong of the *Advanced Bionics* framework, Petitioners failed to demonstrate that the Examiner materially erred in considering Cui-2004 and Cui-2005. Petitioners only assert—in conclusory fashion—that the Examiner must have “overlooked” Cui-2005’s teachings regarding “sleep mode” as “idle power consumption.” Pet. at 23.

But Cui-2004 also teaches “sleep mode,” Ex-1007 at 2806, and the Examiner discussed Cui-2004 at length in the prosecution history, *e.g.*, Ex-1004 at 94-97, 147-150. Therefore, the Examiner would have been familiar with “sleep mode” in allowing claim 25 and concluding that “the prior art of record fails to anticipate or

⁶ If, as Petitioners assert, Cui-2004 “does not teach idle power consumption,” Pet. at 22 n.6, then neither does Cui-2003, as further explained *infra* Section VI.B.i.

render obvious the limitations regarding the consideration of power during idle periods in the mode selection processing.” *Id.* at 189.

Contrary to Petitioners’ claim of teachings being “overlooked,” the record compels the conclusion that the Examiner correctly concluded that “sleep mode” taught in Cui-2004 and Cui-2005 does not disclose the “idle power consumption” limitation. In fact, Petitioners agree that Cui-2004 “does not teach idle power consumption,” Pet. at 22 n.6, despite Cui-2004 teaching “sleep mode.” Further, as discussed *infra* Section VI.B.i, “sleep mode” is distinct from the ’120 Patent’s idle mode. Therefore, Petitioners have not shown that the Examiner materially erred in allowing claim 25 because the prior art, including Cui-2004 and Cui-2005, did not disclose the idle power consumption limitation. *See* Ex-1004 at 189. Both prongs of the *Advanced Bionics* framework are met with respect to Cui-2003.

C. Wu

Petitioners rely on Wu solely to argue that it discloses dependent claim 26 regarding the control signal being “based, at least in part, on a correlation in the communications channel.” *See* Pet. at 53-59. Petitioners explain that Wu teaches that a base station communicates with multiple devices in MIMO mode if the channel correlation is low or communicates with one device in SIMO mode if channel correlation is high. *Id.* at 54-56. This disclosure is substantially the same as that in Gesbert, which discloses techniques for selecting transmission modes, including

MIMO and SIMO, based on the channel parameters including correlations of receive and transmit antennas. Ex-2005 ¶¶ 13-14, 64. The Examiner specifically cited this passage of Gesbert during prosecution. Ex-1004 at 152. Therefore, Wu is cumulative of at least Gesbert, and because Petitioners have not asserted that the Examiner materially erred in his analysis of Gesbert, both prongs of the *Advanced Bionics* framework are met with respect to Wu.

D. Tiirola

Petitioners argue that Tiirola discloses the “number of users” limitation of issued claim 29. But, as further explained *infra* Section VI.E.ii, Tiirola merely describes a simulation in which signal noise increases faster in SIMO mode than in MIMO mode as the number of users increase. *See* Ex-1008 at 661. Tiirola does not suggest using a control signal that takes into account the number of users. In fact, Tiirola does not teach selection of transmission modes at all, and instead teaches away from transmitting in MIMO because “the MIMO concept does not seem feasible for improving UMTS uplink performance.” *Id.* at 657. Therefore, 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. Ex-1004 at 147, 153. Petitioners have not asserted that the Examiner “erred in a manner material to the patentability of” claim 29, and thus the *Advanced Bionics*

framework is satisfied. The Board should exercise discretion under § 325(d) and deny institution.

VI. PETITIONERS HAVE NOT ESTABLISHED A REASONABLE LIKELIHOOD OF UNPATENTABILITY.

The Board should deny institution because Petitioners have failed to demonstrate a reasonable likelihood of prevailing with respect to the patentability of the challenged claims, as required by 35 U.S.C. § 314(a). None of Petitioners' references disclose the "idle power consumption" and "number of users" limitations that were found to be the reasons for patentability of the independent claims in the Notice of Allowance. Ex-1004 at 189. Further, Petitioners have failed to establish that a POSITA would have a motivation to combine the references in Ground 5 because Tirola expressly teaches away from the MIMO transmission mode employed in Li and Siam. Therefore, Petitioners' Grounds 1-5 fail to render obvious the challenged claims of the '120 Patent.

A. Ground 1: Claims 25, 27, and 28 Are Not Obvious Over Li Combined with Siam.

- i. Petitioners fail to demonstrate that Li-Siam discloses the "idle power consumption" limitation of independent claim 25.*

Neither Li nor Siam discloses the selection of a MIMO or SIMO mode in accordance with a control signal based, at least in part, on an idle power consumption of the mobile station.

With respect to Li, Petitioners rely on a passing mention that “a station in idle mode waiting for incoming signals may consume approximately 60% of its battery energy.” Pet. at 41 (quoting Ex-1005 ¶ 18). Li also recognizes that switching between SISO and MIMO mode may reduce power consumption of wireless communication devices. Ex-1005 ¶ 19. But these two observations are insufficient because Li *does not* teach *selecting* a SISO 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, as recited in '120 Patent claim 25. Not a *single one* of Li's claims even references power consumption, let alone idle power consumption or a control signal based, at least in part, thereon. *See id.* at claims 1-49.

Instead, Li teaches that the base station requests that the device switch from a SISO or MISO operating mode to a SISO or MIMO operating mode. *E.g.*, Ex-1005 ¶¶ 19-24. Reduced power consumption may be a result of the mode selection, *see id.* ¶¶ 19, 35, 43, but Li 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. Indeed, Li does not provide any criteria to determine when mode switching should occur or identify the inputs used in determining mode switching; it simply describes the mechanics of how switching is accomplished. *See id.* ¶¶ 24-25, 31. Li describes how a media access control (MAC) processor can be arranged

to receive a physical layer convergence procedure protocol data unit (PPDU); in response to the received PPDU, the MAC outputs a receiver control signal instructing the mobile station to switch its mode. *Id.* ¶ 24. This description does not include any variables, and certainly does not consider idle power consumption, in determining *when* the mode should switch.

Similarly, Siam does not disclose the “idle power consumption” limitation of claim 25. Petitioners assert that “Siam teaches an algorithm that expressly takes circuit power into account when selecting between a SIMO and MIMO mode,” Pet. at 42, but Petitioners do 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. Nor can they, because Siam does not mention “idle mode” or a similar function—rather the references to power consumption are all directed towards “minimiz[ing] the total power consumption *of the network*.” Ex-1006 at 880 (emphasis added). Indeed, the Petition confirms that none of the inputs to the circuit power equation relate to idle power consumption. Pet. at 38 n.11 (“ P_{DAC} , P_{mix} , P_{LNA} , P_{IFA} , P_{filt} , P_{fltr} , P_{ADC} , and P_{syn} are the power consumption values for the digital-to-analog converter (DAC), mixer (MIX), low noise amplifier (LNA), intermediate frequency amplifier (IFA), filters at the transmitter and the receiver sides (FILT), analog-to-digital converter (ADC), and frequency synthesizer (SYN), respectively.” (quoting Ex-1006 at 877)). Rather than *idle* time, references to variation in circuit power are

based on transmitter-receiver *distance*. This, rather than idle power consumption, is the variable by which Siam determines how to reduce total power 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.* at 875. None of the inputs or variables in Siam’s circuit power equation represent or correspond to idle power consumption. *See id.* at 877.

Further evidencing the weakness of Petitioners’ argument, the Petition relies on the same disclosure of circuit power for both claim elements 25[e] and 25[f]. Specifically, with respect to claim element 25[f], Petitioners state that “Siam teaches an algorithm that expressly takes circuit power into account,” Pet. at 42, but this is the same circuit power P_c cited for purposes of claim element 25[e], *id.* at 38-39. The prosecution history confirms that these two claim limitations should not be conflated. Specifically, the Examiner found that the prior art disclosed the limitation of the control signal being “based, at least in part, on a power consumption of the first and second circuitry” but nevertheless concluded 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.” Ex-1004 at 142, 189. Thus, Siam’s disclosure is wholly inadequate because it simply fails to consider “idle power consumption.”

Neither Siam nor Li discloses the “idle power consumption” limitation of claim 25[f], and there is no indication in either reference that combining them could introduce taking into account idle power. Therefore, Petitioners' Ground 1 fails to render obvious claim 25 of the '120 Patent.

ii. Petitioners fail to demonstrate that Li-Siam discloses dependent claim 27.

Petitioners fail to demonstrate that Ground 1 renders obvious claim 27 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.A.i.

iii. Petitioners fail to demonstrate that Li-Siam discloses dependent claim 28.

Petitioners fail to demonstrate that Ground 1 renders obvious claim 28 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.A.i.

B. Ground 2: Claims 25, 27, and 28 Are Not Obvious Over Li-Siam in View of Cui-2003.

i. Petitioners fail to demonstrate that Li-Siam-Cui-2003 discloses the “idle power consumption” limitation of independent claim 25.

In Ground 2, Petitioners supplement Ground 1 with Cui-2003 solely for the “idle power consumption” limitation of claim 25. Pet. at 48-53.

As an initial matter, Petitioners' addition of Cui-2003 solely for claim element 25[f] confirms the insufficiency of Li and Siam for the “idle power consumption”

limitation and, thus, confirms Ground 1 fails. Nevertheless, Cui-2003 does not remedy this problem because it also does not disclose a control signal “based, at least in part, on an idle power consumption of the mobile station,” as recited in claim 25. Instead, Cui-2003 describes a “sleep mode.” Since Cui-2003 does not disclose the “idle power consumption” limitation of claim 25, Ground 2 also fails.

The '120 Patent explains that “idle time is a time during which the transceiver may be waiting to send data over the communications channel. The transceiver may, for example, be waiting for a scheduled start time for the transceiver to use the communications channel. ... [I]f the transmission rate is too slow, a greater number of transceivers may become idle, waiting to send transmissions over the communications channel.” Ex-1001 at 2:60-64, 3:3-5. Thus, the “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. Petitioners and their expert even state that “idle power consumption means that the circuits are powered but have nothing to transmit or receive.” *E.g.*, Pet. at 49; Ex-1002 at 96.

In contrast, Cui-2003 describes sleep mode as “where all the circuits in the signal path ***are shut down*** for energy saving.”⁷ Ex-1007 at 2806 (emphasis added). In fact, Cui-2003 sets the power consumption for the sleep mode P_{sp} to zero because the technology used has almost no power consumption in sleep mode.⁸ *See id.* In

⁷ Cui-2004 also explains that in sleep mode “all the circuits in the signal path ***are shut down*** to save energy.” Ex-1026 at 1092 (emphasis added). Petitioners agree that Cui-2004 “does not teach idle power consumption.” Pet. at 22 n.6. The identical disclosures in Cui-2004 and Cui-2003 indicate that the latter also does not teach idle power consumption.

⁸ Cui-2003 states, “Since CMOS technology is exclusively used in our analysis, the leaking current $I_l \approx 0$ compared with the active mode. Thus, we set $P_{sp} = 0$.” Ex-1007 at 2806 (citation omitted). The '120 Patent also mentions that “[***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 at 3:5-7 (emphasis added). Thus, the '120 Patent indicates that the idling transceivers do not typically turn off their transmission chains, so the idle power consumption is generally not limited to the leakage current. *See id.*

addition, Cui-2003 explains that there is a transient mode when switching from sleep mode to active mode, indicating that the device is not ready and waiting to transmit in sleep mode. *Id.*

Cui-2003 never mentions power consumption during an idle time, and the '120 Patent never mentions power consumption during sleep mode. *See* Ex-1001; Ex-1007. At least two of Petitioners' other references confirm that sleep mode and idle mode are distinct, showing that a POSITA would not treat them to be equivalent. *First*, while Cui-2003 explains that there is almost no power consumed during sleep mode, Ex-1007 at 2806, Li states that a device in idle mode "may consume approximately 60% of its battery energy," Ex-1005 ¶ 18. The vast difference in power consumed in sleep and idle mode demonstrates that these modes are distinct.

Second, U.S. Patent Publication No. 2005/0250452 ("Walton") explicitly distinguishes idle mode from sleep mode. *E.g.*, Ex-1031 Fig. 3A-3B, ¶¶ 45-61. Walton explains that a wireless device may operate in a number of different states, including an idle state, a sleep state, and a communication state, as illustrated in Figure 3A below. *Id.* at ¶ 45.

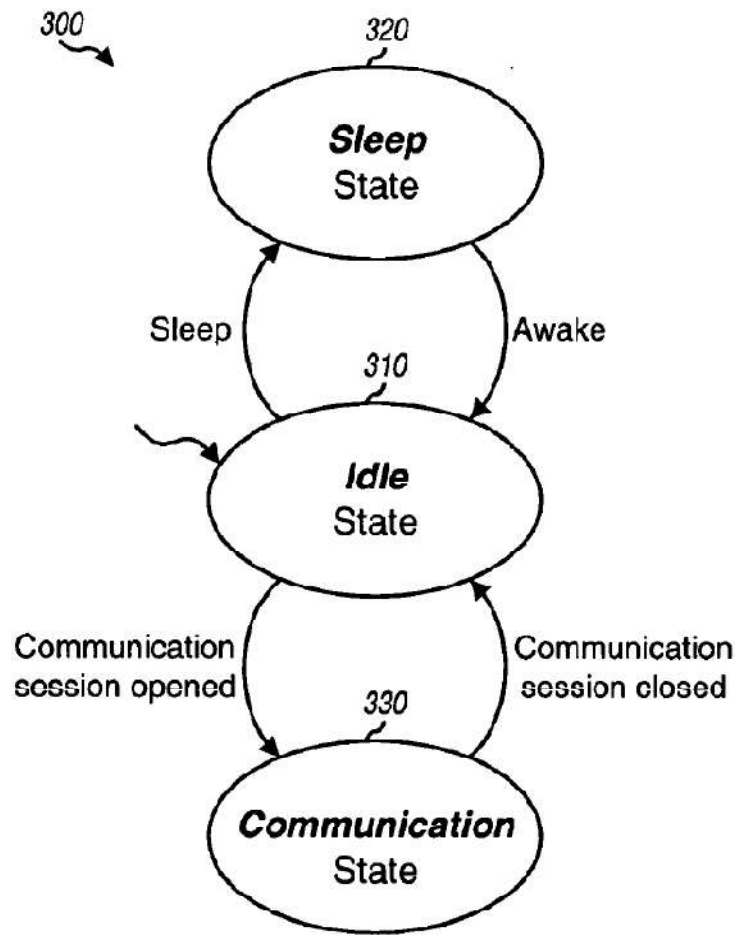


FIG. 3A

Id. at Fig. 3A. Figure 3A shows that in the idle state, unlike the sleep state, the device is awake. *Id.*

Walton also 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.” *Id.* at ¶ 49. In contrast, Walton states that “[i]n the Sleep state, wireless device 100a may shut down as many circuit blocks as possible to conserve power,” *id.* at ¶ 51, which echoes Cui-2003’s description of

sleep mode, Ex-1007 at 2806 (“all the circuits in the signal path are shut down for energy saving”). By quoting these two passages from Walton, Petitioners’ expert acknowledges that there are distinct idle and sleep states. Ex-1002 at 38. Furthermore, Walton establishes that sleep state and idle state are two separate states because the wireless device may “transition” from one to the other. *E.g.*, Ex-1031 ¶ 51 (while in sleep state, the wireless device may “monitor for certain interrupts (e.g., user input) that can trigger an immediate transition to the Idle state”).

Therefore, a POSITA would understand that Cui-2003’s sleep mode does not disclose the ’120 Patent’s idle mode, despite Petitioners’ assertion otherwise. *Cf.* Pet. at 51. Petitioners’ unsupported argument that “mobile stations in sleep mode may nevertheless continue to consume power since they are not completely shut down,” *id.*, is belied by Cui-2003’s explicit description that in sleep mode “all the circuits in the signal path **are shut down** for energy saving,” Ex-1007 at 2806 (emphasis added). Petitioners’ other references also establish that in sleep mode, unlike in idle mode, as many circuit blocks as possible are **shut down** to conserve power. Ex-1031, ¶¶ 49, 51. Petitioners’ 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. Therefore, Ground 2 fails to teach the limitations of claim 25

of the '120 Patent because Cui-2003, and the other asserted art from Ground 1, do not disclose the "idle power consumption" limitation.

ii. Petitioners fail to demonstrate that Li-Siam-Cui-2003 discloses dependent claim 27.

Petitioners fail to demonstrate that Ground 2 renders obvious claim 27 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.B.i.

iii. Petitioners fail to demonstrate that Li-Siam-Cui-2003 discloses dependent claim 28.

Petitioners fail to demonstrate that Ground 2 renders obvious claim 28 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.B.i.

C. Ground 3: Claim 26 Is Not Obvious Over Li-Siam in View of Wu.

Petitioners fail to demonstrate that Ground 3 renders obvious claim 26 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.A.i.

D. Ground 4: Claim 26 Is Not Obvious Over Li-Siam-Cui-2003 in View of Wu.

Petitioners fail to demonstrate that Ground 4 renders obvious claim 26 of the '120 Patent, a claim depending from claim 25, for the same reasons explained *supra* Section VI.B.i.

E. Ground 5: Claim 29 Is Not Obvious Over Li-Siam in View of Tirola.

- i. Petitioners have not established a motivation to combine Li-Siam and Tirola.*

A POSITA would not have been motivated to combine Li-Siam with Tirola. When combining teachings from different references, a patent challenger must “identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007). One reason **not** to combine different references is when one reference teaches away from the asserted combination. *See Arctic Cat Inc. v. Bombardier Recreational Prods. Inc.*, 876 F.3d 1350, 1360 (Fed. Cir. 2017). “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.’” *Id.* (citing *Allergan, Inc. v. Sandoz Inc.*, 796 F.3d 1293, 1305 (Fed. Cir. 2015)).

A POSITA would not have combined Li-Siam with Tirola because Tirola teaches away from using MIMO. Petitioners argue that a POSITA would have been motivated to combine Li-Siam with Tirola “to improve the Li-Siam system in the presence of multiple users” because integrating Tirola allegedly will help indicate instances where a SIMO mode is not favorable. Pet. at 61-62. But a POSITA seeking

to optimize system performance would have been pulled in separate directions by reading Li-Siam and Tirola. While Li touts how “[t]echniques to improve control and management of a **MIMO** system *may improve* overall system performance,” Ex-1005 ¶ 1 (emphasis added), Tirola claims that “[b]ased on this study the **MIMO** concept *does not seem feasible for improving* UMTS [Universal Mobile Telecommunications System] uplink performance,” Ex-1008 at 657 (emphasis added). Far from “straightforward,” it would have been counterintuitive to combine Li-Siam’s mode-switching with Tirola in view of Tirola’s *express disparagement of MIMO*. Pet. at 63.

More specifically, Li-Siam and Tirola contain conflicting views on the value of diversity gains from MIMO technology. Siam touts “[s]ignificant improvement in network performance” achieved by MIMO techniques “whereby multiple transmit and/or receive antennas are exploited to achieve spatial diversity.” Ex-1006 at 875. Indeed, Siam describes diversity gains as one of the three types of gains from MIMO, and as one of the two focuses of its assessments of MIMO’s benefits. *Id. Tirola does not recognize any such benefits to transmit diversity:*

As a summary, it can be said that the doubling of the number of receiving antennas [i.e., SIMO] will almost double the isolated cell capacity, whereas the increase of the number of transmit antennas [i.e., MIMO] will mostly have negative impact on the isolated cell capacity

... The results showed that transmit diversity [i.e., MIMO] in UL does not increase the isolated cell capacity.

Ex-1008 at 660; *see also id.* at 657 (“For example, in terms of isolated cell capacity, a MIMO technique with 2 transmit (Tx) and 2 receive (Rx) antennas performed approximately 50% worse than a traditional approach with 1 Tx and 4 Rx antennas.”). Thus, Tirola concludes that “from the uplink coverage studies it can be stated that increasing the number of receive antennas is more feasible than employing the MIMO concept. *Id.*

Rather than address how a POSITA would have attempted to resolve the contradictory stances regarding MIMO, Petitioners err in ignoring Tirola’s negative views of MIMO. *See Arctic Cat*, 876 F.3d at 1360 (“[W]e have held that it is error to fail to consider the entirety of the art.”). Petitioners do not confront Tirola’s questioning of MIMO and instead focus on the only passage where the results in Tirola suggest that MIMO *may* work—a set of results Tirola rejected and did not motivate even Tirola to implement MIMO. *Compare* Pet. at 61-62 (citing Ex.1008, Fig. 4b), *with* Ex-1008 at 659 (identifying Fig. 4b as “the only simulated case in which the usage of the 2nd transmit antenna provides some capacity gain in an isolated cell”). Petitioners mischaracterize Tirola’s full assessment of MIMO to even suggest that Tirola has arguable relevance here.

Petitioners also argue that Li-Siam and Tirola address the issue of power consumption “in similar and predictable ways, namely, by selecting and/or switching to an optimal transmission mode to improve overall system performance.” *Id.* at 63. But these references draw fundamentally different conclusions about what is an “optimal transmission mode”—Li and Siam describe ways MIMO can **improve** network performance, Ex-1005 ¶ 1, Ex-1006 at 875, while Tirola **dismisses any potential for MIMO to improve** uplink performance as not feasible, Ex-1008 at 660 (“The results showed that transmit diversity in UL does not increase the isolated cell capacity ... Doubling the number of receiving antennas is much more effective than introducing the 2nd transmit antenna.”). Thus, a POSITA would not have been motivated to combine Li-Siam with Tirola. *See Arctic Cat*, 876 F.3d at 1360.

- ii. *None of Petitioners' asserted references disclose a control signal based, at least in part, on a number of users of the communications system.*

Petitioners' Ground 5 fails because none of the asserted references disclose a “control signal based, at least in part, on the number of users of the communication system,” as recited in claim 29. Petitioners exclusively rely on Tirola for the “number of users” limitation. Pet. at 65-68. But Tirola merely describes a simulation in which signal noise increases in SIMO and MIMO transmission modes as the number of users increase. *See* Ex-1008 at 659, 661. Petitioners use only one example of these simulations to assert that, overall, Tirola teaches that “the advantage of a

MIMO mode increases with increasing number of users.” Pet. at 66-67. But the other simulations in Tiirola, depicted in Figures 4(a), (c), and (d), all show that noise rise is approximately equal for a 1x2 (SIMO) mode and 2x2 (MIMO) mode, or even that noise rise is greater for the MIMO mode than the SIMO mode. Ex-1008 at 661.

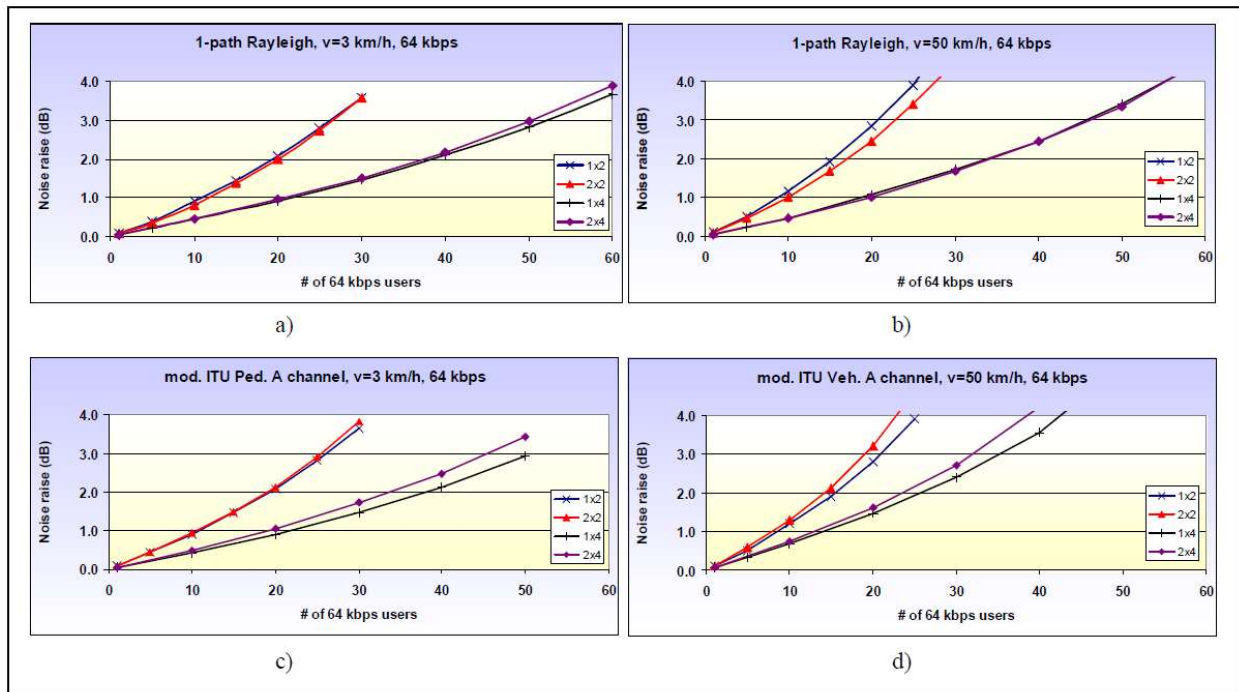


Figure 4. UL noise rise, SIMO and MIMO, 64 kb/s.

The results of the *entirety* of Tiirola's simulations lead the authors to conclude that “the doubling of the number of receiving antennas [i.e., SIMO] will almost double the isolated cell capacity, whereas the increase of the number of transmit antennas [i.e., MIMO] will mostly have *negative impact* on the isolated cell capacity.” *Id.* at 660 (emphasis added). Therefore, despite Petitioners' claim, Tiirola *does not* teach “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.” Pet. at 67.

Regardless of these noise level simulations, Tirola does not teach or suggest using a control signal that considers the number of users in determining transmission mode selection. Petitioners cite equations from Tirola simulating “the number of users,” Pet. at 66, but these equations are solely for Tirola’s simulations and have no application with respect to transmission mode selection in a mobile device. As explained above, Tirola does not teach transmission mode selection at all. Instead Tirola teaches away from transmitting in MIMO because “the MIMO concept does not seem feasible for improving UMTS uplink performance.” Ex-1008 at 657. Tirola’s rejection of MIMO also precludes combination with Li’s switching to a MIMO operating mode (in addition to the lack of motivation to combine, explained *supra* Section VI.E.i). *See, e.g., id.*; Ex-1005 ¶ 24. Therefore, Ground 5 fails to render obvious claim 29 of the ’120 Patent because Tirola, and the other asserted art from Ground 1, do not disclose the “number of users” limitation.

VII. THE BOARD SHOULD DENY INSTITUTION UNDER *FINTIV*.

The Petition should be denied under 35 U.S.C. § 314(a) because all six *Fintiv* factors weigh in favor of discretionary denial. The parallel district court litigation against Petitioners has been pending for one year and trial is scheduled to begin

approximately *six months* before the statutory deadline for the Board's final written decision. That trial will settle any questions regarding the validity of the '120 Patent.

In determining whether to exercise discretion to institute under § 314(a), the Board considers the six factors enumerated in the precedential *Fintiv* order:

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.

Apple Inc. v. Fintiv, Inc., No. IPR2020-00019, Paper 11 at 5-6 (P.T.A.B. Mar. 20, 2020) (precedential).

Petitioners did not address any of these factors, despite the Board's clear direction that the *Fintiv* factors "are expected to be addressed in some manner in the petition when it is reasonably foreseeable that patent owner may raise these issues." *Regeneron*, No. IPR2020-01317, Paper 14 at 6. Petitioners had good reason to

expect that Patent Owner would make an argument under *Fintiv* because of the advanced stage of the parallel district court litigation and impending claim construction deadlines, yet Petitioners declined to address discretionary denial under § 314(a). *See Vector Flow, Inc. v. HID Glob. Corp.*, No. IPR2023-00353, Paper 8 at 18 (July 17, 2023) (denying petitioner's request to file a Reply because the petitioner had "good reason" to expect a *Fintiv* argument, and stating "if Petitioner wished to provide a more complete *Fintiv* analysis for us to consider, it should have done so in the Petition") (citing 37 C.F.R. § 42.108(c) (requiring a petitioner to show good cause for leave to file a reply to the preliminary response)). When the *Fintiv* factors are properly considered, they clearly weigh in favor of the Board's exercising discretion to deny institution under § 314(a).

A. Factor 1: "Whether the Court Granted a Stay or Evidence Exists that One May Be Granted if a Proceeding Is Instituted"

Petitioners have not filed a motion to stay the parallel district court litigation. And there is no indication that Petitioners will even request a stay, as any motion for a stay is almost certain to be denied because the Eastern District of Texas routinely denies a pre-institution motion to stay. *See, e.g., Netlist, Inc. v. Samsung Elecs. Co.*, No. 2:22-cv-00293-JRG, ECF No. 180 at 3 (E.D. Tex. Oct. 17, 2023) (denying a stay where the Board had instituted an IPR against three of the four asserted patents and noting "this Court has a consistent practice of denying motions to stay when the

PTAB has yet to institute post-grant proceedings”). Even if instituted, the timing and advanced stage of litigation indicates that Judge Gilstrap is highly likely to deny a motion to stay. *See, e.g., Netlist, Inc. v. Samsung Elecs. Co.*, No. 2:22-cv-00293-JRG, ECF No. 689 at 4-5 (E.D. Tex. Mar. 11, 2024); *MyPort, Inc. v. Samsung Elecs. Co.*, Case No. 2:22-cv-00114-JRG, ECF No. 73 at 4-5 (E.D. Tex. June 13, 2023); *Solas OLED Ltd. v. Samsung Display Co.*, No. 2:19-cv-00152-JRG, ECF No. 133 at 3-4 (E.D. Tex. July 17, 2020); *Oyster Optics, LLC v. Infinera Corp.*, No. 2:19-cv-00257-JRG, ECF No. 87 at 4-5 (E.D. Tex. July 17, 2020). Indeed, trial in the Eastern District is scheduled to end less than nine months from now. *See* Ex-2006 (Docket Control Order) at 1. Given that a stay of the district court litigation is unlikely, this factor weighs in favor of denying institution.

B. Factor 2: “Proximity of a Trial Date to the Projected Statutory Deadline for a Final Written Decision”

“If the court’s trial date is earlier than the projected statutory deadline, the Board generally has weighed this fact in favor of exercising authority to deny institution under *NHK*.” *Fintiv*, No. IPR2020-00019, Paper 11 at 9 (citing *NHK Spring Co. v. Intri-Plex Techs., Inc.*, No. IPR2018-00752, Paper 8 (P.T.A.B. Sept. 12, 2018) (precedential)). The Board has denied institution where trial in a parallel district court litigation was scheduled to conclude as little as one month prior to the statutory deadline for the final written decision. *E-One, Inc. v. Oshkosh Corp.*, No.

IPR2019-00161, Paper 16 at 6, 9 (P.T.A.B. May 15, 2019); *see also Samsung Elecs. Co. v. Mojo Mobility Inc.*, No. IPR2023-01091, Paper 11 at 12 (P.T.A.B. Jan. 8, 2024) (district court trial scheduled to conclude five months before the statutory deadline); *Next Caller Inc. v. TrustID, Inc.*, No. IPR2019-00961, Paper 10 at 8-9 (P.T.A.B. Oct. 16, 2019) (district court trial scheduled to conclude three months before the statutory deadline).

Here, Factor 2 weighs against institution because the trial date in the parallel district court litigation is ***six months earlier*** than the projected statutory deadline for the Board's final written decision here. The trial in the parallel district court litigation is scheduled to begin with jury selection on June 23, 2025, Ex-2006 (Docket Control Order) at 1, which is approximately six months before the statutory deadline for the Board's final written decision on December 18, 2025, *see* 35 U.S.C. § 314(b)(1) (institution decision due within three months after the preliminary response to the petition); 35 U.S.C. § 316(a)(11) (requiring that the final determination be issued not later than one year after the notice of institution of review).

The trial date is consistent with the Federal Court Management Statistics for the Eastern District of Texas. Current statistics indicate that, over the past six years, a civil case in the district was brought to trial 19.6 months after filing. Ex-2007 (2023 Trial Statistics) (indicating median times to trial for civil cases for the twelve-month period ending in December for 2018-2023 as 19.0, 17.8, 17.5, 23.0, 19.0, and 21.4).

Here, the trial in the parallel district court litigation is set to begin approximately 21 months after the case was filed. The Petition presents no evidence that the district court trial will not proceed on the set date, which, as noted above, is consistent with the most current time-to-trial statistics for the Eastern District of Texas. Thus, “based on the evidence of record, there is no evidence to suggest that trial will be delayed.” *Nine Energy Serv. Inc. v. NCS Multistage Inc.*, No. IPR2020-01615, Paper 18 at 9 (Mar. 24, 2011).

C. Factor 3: “Investment in the Parallel Litigation”

The Board has found that this factor favors exercising discretion to deny institution where the parallel district court litigation has “advanced well beyond the pleadings stage.” *Samsung Elecs.*, No. IPR2023-01091, Paper 11 at 13-14. For example, the Board found that institution should be denied where significant fact discovery was completed, including the passing of the substantial completion deadline for document discovery, and fact discovery was scheduled to close approximately two months after the issuance of the institution decision. *Id.* Additionally, completion of briefing for the *Markman* hearing during the month that the Board issued its institution decision, with the *Markman* hearing scheduled for the following month, favored denying institution. *Id.*; *see also Roku, Inc. v. IOEngine, LLC*, No. IPR2022-01552, Paper 11 at 12-13 (P.T.A.B. May 5, 2023) (finding “substantial investment by the parties and the district court in the parallel

proceeding, including the completion of preliminary disclosures and claim construction, and the near-completion of discovery” weighed heavily in favor of denial of institution); *BOE Tech. Grp. Co. v. Element Cap. Com. Co.*, No. IPR2023-00808, Paper 9 at 23-24 (P.T.A.B. Nov. 15, 2023) (finding “[s]ignificant discovery has been completed, including the exchange of infringement and invalidity contentions, document requests and interrogatories, and proposed claim terms for construction, and the December 1 date for the close of fact discovery is near,” which favored denial of institution).

These circumstances are present here and weigh in favor of denying institution. The parallel district court litigation has “advanced well beyond the pleadings stage.” *See Samsung Elecs.*, No. IPR2023-01091, Paper 11 at 13-14. Patent Owner and Petitioners exchanged infringement and invalidity contentions in January and March of this year, respectively. *See BOE Tech. Grp. Co.*, No. IPR2023-00808, Paper 9 at 23-24. Significant fact discovery has also been completed, including (i) substantial completion of document production **by all parties**, including production of more than 12,000 documents by the parties and five non-parties; (ii) Petitioners’ service of and receipt of responses to subpoenas to 15 non-parties, including Qualcomm Inc., Broadcom Corp., Intel Corp., Marvell Technology, Inc., MediaTek USA Inc., Texas Instruments Inc., University of Texas at Austin, Allied Inventors, Inc., Steger IP, Xinova, LLC, Ali Yazdan Panah, Gustavo de Veciana,

Hongseok Kim, Robert W. Heath, Jr., and Institute of Electrical and Electronics Engineers, Inc.; (iii) responses to multiple rounds of interrogatories by both parties, and (iv) coordinating source code review. By the statutory deadline for the institution decision on December 18, 2024, briefing for the *Markman* hearing, including expert depositions in preparation therefor, will be complete. Ex-2006 (Docket Control Order) at 3. The *Markman* hearing is scheduled to occur almost one year before the Final Written Decision here and approximately one month after the issuance of the Board's institution decision. *See id.* These circumstances favor exercising discretion to deny institution. *See Samsung Elecs.*, No. IPR2023-01091, Paper 11 at 13-14.

Furthermore, "it may impose unfair costs to a patent owner if the petitioner, faced with the prospect of a looming trial date, waits until the district court trial has progressed significantly before filing a petition at the Office." *Fintiv*, No. IPR2020-00019, Paper 11 at 11. Where "the evidence shows that the petitioner did not file the petition expeditiously . . . these facts have favored denial." *Id.* at 11-12; *see also Next Caller Inc.*, No. IPR2019-00961, Paper 10 at 15-16 (finding Petitioner's unexplained delay in filing the Petition more than two months after it filed invalidity contentions weighed in favor of denying institution). Here, Petitioners waited approximately nine months after service of the complaint, and approximately three months after service of Petitioners' invalidity contentions, before filing the Petition. Petitioners offer no explanation for this delay, which further weighs in favor of denying

institution. *See Fintiv*, No. IPR2020-00019, Paper 11 at 11; *Next Caller Inc.*, No. IPR2019-00961, Paper 10 at 15-16.

D. Factor 4: “Overlap Between Issues Raised in the Petition and in the Parallel Proceeding”

“[I]f the petition includes the same or substantially the same claims, grounds, arguments, and evidence as presented in the parallel proceeding, this fact has favored denial.” *Fintiv*, No. IPR2020-00019, Paper 11 at 12. Even if the petition includes non-overlapping claims, this may still favor denial of institution if the claims are all directed to the same subject matter. *See id.* at 13 (citing *Next Caller Inc.*, No. IPR2019-00961, Paper 10 at 14). At the district court, Petitioners are seeking to invalidate independent claims 25 and 29 using the same prior art asserted here. *See* Ex-2008 (Petitioners’ Invalidity Contentions). Specifically, Petitioners’ grounds for independent claims 25 and 29 are obviousness grounds based on Li, Siam, Cui-2003, and Tirola, all of which Petitioners rely upon in the district court litigation for various invalidity grounds, including obviousness. *Id.* at 9 (identifying Li, Siam, and Cui-2003 as “Primary References”); *id.* at 11 (identifying exemplary combinations of “Li alone or in combination with one of more of ... Cui-2003 ... Siam, Tirola...”). Thus, all the prior art invalidity theories presented in the Petition with respect to independent claims 25 and 29 appear in the district court litigation. Although Petitioners also seek review of three claims that depend on claim 25 here,

these dependent claims are substantially the same because they are all directed to the same subject matter as evidenced by the fact that the Petition uses the same primary references (Li, Siam, and Cui-2003) for these three dependent claims. *See Fintiv*, No. IPR2020-00019, Paper 11 at 13; *Next Caller Inc.*, No. IPR2019-00961, Paper 10 at 14. Moreover, the deficiencies in Petitioners' prior art grounds concerning independent claim 25 also exist as to all claims that depend from claim 25.

Furthermore, Petitioners have not stipulated, either in the Petition or in the district court, not to pursue the same grounds in both proceedings. Indeed, Petitioners made the affirmative election *not* to offer a stipulation before Patent Owner submitted this Preliminary Response. Pet. at 68. Petitioners are bound by that election, as they cannot show good cause for failing to offer a stipulation they knew was available. *See* 37 C.F.R. § 42.108(c) (stating that a petitioner may only seek leave to file a reply to the preliminary response upon a showing of good cause). This proceeding could not possibly be an efficient alternative when Petitioners intend to assert the exact same prior art in the district court and have affirmatively stated they knew they could have stipulated yet chose not to. *See, e.g., Code200, UAB v. Luminati Networks Ltd.*, No. IPR2020-01506, Paper 10 at 11-12 (P.T.A.B. Feb. 16, 2021) (denying institution, where "the overlap in issues between the two proceedings is substantial" and there were not "any stipulations filed or actions taken by Petitioner to reduce the overlap between the proceedings"); *Apcon, Inc. v. Gigamon*

Inc., No. IPR2020-01579, Paper 9 at 26 (P.T.A.B. Mar. 16, 2021) (denying institution where “the art appears substantially the same, and no stipulation has been filed by Petitioner agreeing not to assert the same art”).

Even if Petitioners were to belatedly try to change their position and offer some form of stipulation after all, it would still be insufficient to overcome the overwhelming weight of the other factors in favor of denying institution. *See, e.g., BOE Tech. Grp. Co.*, No. IPR2023-00808, Paper 9 at 34-35 (“Here, we find that the approximately 6-month delay between the estimated trial date and the deadline for a final written decision in this IPR (factor 2), the progress of and investment made by the parties and the Court in the District Court Litigation (factor 3), and the fact that Petitioner is also a party in the District Court Litigation (factor 5) outweigh Petitioner’s stipulation mitigating the concerns about overlap between the two proceedings (factor 4).”).

E. Factor 5: “Whether the Petitioner and the Defendant in the Parallel Proceeding Are the Same Party” or Related Entities

Where the same parties are involved in both the PTAB proceeding and the parallel district court litigation, this factor weighs in favor of denying institution. *E.g., Samsung Elecs.*, No. IPR2023-01091, Paper 11 at 18 (citing *Sotera Wireless, Inc. v. Masimo Corp.*, No. IPR2020-01019, Paper 12 at 19 (PTAB Dec. 1, 2020) (precedential as to § II.A)). Here, Petitioners and Patent Owner are the exact same

parties as in the parallel district court litigation. *See* Pet. at 1. Accordingly, this factor weighs in favor of discretionary denial. *See, e.g., Samsung Elecs.*, No. IPR2023-01091, Paper 11 at 18.

F. Factor 6: “Other Circumstances that Impact the Board’s Exercise of Discretion, Including the Merits”

At least two other factors are present and favor denial.

First, this Petition offers no compelling argument on the merits because the Petition suffers from significant weaknesses and gaps in proof. *See Fintiv*, No. IPR2020-00019, Paper 11 at 15 (stating that weaknesses in “the merits of the grounds raised in the petition . . . favor[] denying institution when other factors favoring denial are present”); *Commscope Techs. LLC v. Dali Wireless, Inc.*, No. IPR2022-01242, Paper 23 at 5 (Feb. 27, 2023) (precedential) (order by Director Vidal requiring the Board to assess the “compelling merits” factor if *Fintiv* factors 1-5 favor denial of institution). As explained *supra* Section VI, Petitioners cannot meet their burden of establishing a reasonable likelihood that they will prevail because none of the asserted references disclose the “idle power consumption” or “number of users” limitations—the key characteristics of the challenged claims on which the Examiner issued the Notice of Allowance. *See* Ex-1004 at 189. Thus, since the Petition fails to present a “compelling unpatentability challenge,” Ex-2009

(Interim Procedure for Discretionary Denials) at 4-5, the Board has the authority to exercise discretion to deny institution in view of *Fintiv*.

Second, Petitioners significantly delayed in filing this IPR. In their March 29, 2024 invalidity contentions served in the district court litigation, Petitioners cited the exact same references to challenge independent claims 25 and 29 relied upon in this Petition. *See* Ex-2008 (Petitioners' Invalidity Contentions). Despite Petitioners' awareness of the asserted references, Petitioners did not file the Petition until June 12, 2024—nearly three months later. Petitioners' unexplained delay ensured that the parties and the district court would invest more in the parallel litigation and that trial will proceed months before any final written decision. *See Next Caller Inc.*, No. IPR2019-00961, Paper 10 at 16 (the “additional factor” of petitioner’s “unexplained delay in filing this Petition favors denying institution”; had petitioner filed its petition “around the same time as the service of the initial invalidity contentions, the proceeding in this case may have resolved the issues prior to the Parallel District Court Proceeding”). Not only did Petitioners delay the filing of their Petition by approximately ***three months*** after serving their invalidity contentions in the district court, but Petitioners sought and received an extension of 30 days to serve their invalidity contentions so that the contentions were served ***more than six months after Patent Owner filed the district court Complaint.***

* * *

In sum, each of the *Fintiv* factors favors denial of institution. The *Fintiv* factors indicate that instituting review in this case would not be an efficient use of the Board's resources and would not serve the objective of providing an effective and efficient alternative to district court litigation. *See Fintiv*, No. IPR2020-00019, Paper 11 at 6.

VIII. CONCLUSION

For any or all of the independently sufficient reasons discussed above, the Board should deny institution.

Dated: September 18, 2024

Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH 37 C.F.R. § 42.24

Pursuant to 37 C.F.R. § 42.24(d), the undersigned certifies that the present paper contains 11,777 words as counted by the word-processing program used to generate the brief. This total does not include the tables of contents and authorities, the caption page, table of exhibits, certificate of service, or this certificate of word count.

Dated: September 18, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that the above document was served on September 18, 2024, by filing this document through the Patent Trial and Appeal Board P-TACTS System, as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioners:

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