

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 SUR-REPLY

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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 .
Ex-2010	Defendants’ Identification of Preliminary Claim Constructions, <i>Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.</i> , 2:23-cv-00427, ECF No. 25 (E.D. Tex. Oct. 9, 2024)
Ex-2011	Preliminary Constructions, <i>Empire Technology Development LLC v. Samsung Electronics Co., Ltd., et al.</i> , 2:23-cv-00427 (E.D. Tex. Jan. 22, 2025)

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Ex-2013	Transcript of Matthew C. Valenti, Ph.D., dated Mar. 7, 2025, IPR2024-00896
Ex-2014	Bin Zhao and Matthew C. Valenti, "Position-Based Relaying with Hybrid-ARQ for Efficient Ad Hoc Networking," EURASIP J. on Wireless Communications and Networking, 2005:5, 610-624
Ex-2015	Matthew C. Valenti and Bin Zhao, "Hybrid-ARQ Based Intra-cluster Geographic Relaying"
Ex-2016	Bin Zhao, Rohit Iyer Seshadri and Matthew C. Valenti, "Geographic Random Forwarding with Hybrid-ARQ for Ad Hoc Networks with Rapid Sleep Cycles"
Ex-2017	Isabella D. Lutz and Matthew C. Valenti, "Bridging the Security Gap: Lessons from 5G and What 6G Should Do Better"
Ex-2018	Excerpts from Telecom Dictionary, 2007
Ex-2019	Excerpts from Newton's Telecom Dictionary, 2008
Ex-2020	U.S. Patent No. 7,596,378
Ex-2021	U.S. Patent No. 7,912,518
Ex-2022	Declaration of Robert Akl, D.Sc.
Ex-2023	Excerpts from Dictionary of Engineering, McGraw-Hill, 2d Ed., 2003
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I. INTRODUCTION

Empire Technology Development, LLC (“PO”) submits this Sur-Reply to Samsung Electronics Co., Ltd. and Samsung Electronics America, Inc.’s (collectively, “Petitioners”) Petition.

Each of Petitioners’ Grounds fails for multiple reasons described in PO’s Response. *First*, regarding all Grounds, a POSITA would not have been motivated to combine the systems of Li, Siam, and Cui-2003 or Li, Siam, and Tirola to arrive at the claimed invention without hindsight. Petitioners’ proffered motivations are conclusory, unsupported by the evidence, and fail to explain how the combinations would have worked. This is a first independent reason why all Grounds fail. *Second*, regarding Grounds 1-4, neither Li nor Cui-2003 discloses or suggests a control signal based in part on the “idle power consumption of the mobile station” under the Board’s preliminary claim construction, although PO submits that such preliminary construction is overbroad. Li’s single mention of “idle mode” and Cui-2003’s dismissal of sleep mode in its energy equation offer no teaching or suggestion about considering idle power consumption in a control signal, even when the overbroad preliminary construction is applied. This is a second independent reason why Grounds 1-4 fail. *Third*, Cui-2003’s sleep mode is completely different from idling, and no POSITA would treat a zero-power state as disclosing or suggesting idling. Properly construed, claim 25 does not cover Cui-2003’s sleep mode, and Li’s limited

disclosure is still insufficient to teach or suggest the “idle power consumption” limitation. This is a third independent reason why Grounds 1-4 fail. *Fourth*, regarding Ground 5, Tirola does not disclose or suggest a control signal based in part on the “number of users of the communications system.” Tirola does not teach or suggest performing mode selection based on the number of users. Petitioners’ Reply does not remedy these defects, and the testimony of the experts confirms PO’s arguments.

II. CLAIM CONSTRUCTION

The Board’s preliminary construction of “idle power consumption” is overbroad, as explained below. Nevertheless, even if the Board’s preliminary construction becomes final (it should not), all Grounds in the Petition fail for other reasons.

The district court’s final claim construction, the intrinsic evidence, and expert testimony from both sides show that the Board’s preliminary construction warrants re-consideration. Each of these three major pieces of evidence supports PO’s position that “idle power consumption” does not include times when the transceiver is off because idling means waiting to send and does not cover a powered-off transceiver. Petitioners’ argument regarding Cui-2003 requires, among other things,

that idling cover a powered-off transceiver.¹

The term “idle power consumption” should be construed to mean (i) “power consumed by the mobile station when the mobile station is powered on and waiting to send” as stated in the district court’s final construction, Ex-1050, 12, or (ii) “power consumed when the mobile station and first and second circuitry are powered on and waiting to send” as stated in the PO Response. POR, 12. As explained further below, these two constructions are substantively identical, and Petitioners’ argument to the contrary is unsupported by the evidence.

A. The District Court’s Final Construction Supports Patent Owner

The district court’s final construction, like the district court’s preliminary construction, fully supports PO. Petitioners attempt to draw a distinction between the district court’s final and preliminary constructions in an unsupportable effort to lead the Board into error. A side-by-side comparison of the Board’s preliminary construction and the district court’s final and preliminary constructions highlights two important points: (i) the Board’s preliminary construction is different from both the district court’s final and preliminary constructions because it misdescribes idle

¹ The Petition states three times that “idle power consumption means that the circuits are powered but have nothing to transmit or receive,” Pet., 25 n.8, 41 n.12, 49. The Petition also states that “the claimed ‘idle’ mode” has “circuits powered on but not transmitting.” *Id.*, 46. Petitioners now try to change this position and mischaracterize the district court’s constructions.

time (and, thus, cannot accurately define “idle *power* consumption”) and (ii) any differences between the district court’s final and preliminary constructions are non-substantive and do not help Petitioners.

Board Preliminary Construction	District Court Preliminary Construction	District Court Final Construction
“Power consumption during which the transceiver may be waiting to send data, whether the transceiver is on or off.” Paper 15, 25.	“ <i>Power consumed</i> by the first and second circuitry <i>when the mobile station is powered on</i> , enabled for transmitting, <i>but waiting to send.</i> ” ² Ex-2011, 1.	“ <i>Power consumed</i> by the mobile station <i>when the mobile station is powered on and waiting to send.</i> ” Ex-1050, 12.

The district court’s final construction is correct because an idle time is when the mobile station is powered on and waiting to send. It thus follows that idle ***power consumption*** is the power consumed during this idle ***time***. The problem with the Board’s preliminary construction is that it covers a powered-off transceiver and “idle power consumption” does not include times when the transceiver is powered off. *See* Ex-1050, 12 (“The Court agrees with Empire that a fully powered-off mobile station does not have ‘idle power consumption’ within the meaning of the claims.”).

Petitioners emphasize the district court’s statement “[n]or must all the circuitry of the mobile station be turned on for it to be ‘idle,’” but this passage only confirms PO’s position. According to the district court, “the specification shows the

² All emphases have been added unless otherwise noted.

‘idle’ time is simply the time in which the device is on and waiting to transmit,” Ex-1050, 12, thus confirming that transceiver circuitry must be idling and waiting to send transmissions but some *other* circuitry elsewhere on the phone need not be on. See Ex-1001, 3:3-5 (“[I]f the transmission rate is too slow, *a greater number of transceivers may become idle, waiting to send transmissions* over the communication channel.”). In other words, idling requires the transceiver circuitry to be on and waiting to send but idling does not require “all the circuitry of the mobile station be turned on.” Ex-1050, 12.

B. The Specification Supports Patent Owner's Position

A plain reading of the specification shows that “idle power consumption” is the power consumed by the mobile station when the transceivers are idle and waiting to send data over the communication channel:

The energy-optimized rate may also or instead be based, at least in part, on a power consumption of the transceiver during an idle time. *The 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 communication channel.

Ex-1001, 2:58-64, 3:3-5. The specification states that the transceivers must be idle and waiting to send transmissions, making clear that the transceivers cannot be

powered off during idle times. This is fully consistent with the district court's construction of "power consumed by the mobile station when the mobile station is powered on and waiting to send," Ex-1050, 12, because when the mobile station is powered on ***and waiting to send***, the transceivers must be idling and cannot be powered off.

Any attempt to look for an explicit definition "requiring the circuitry to be powered on" or an express exclusion of "circuitry that is powered off," Paper 15, 25, runs counter to the intrinsic record, where, as here, the specification clearly states the scope of the invention by describing idling as when a ***transceiver is waiting to send data***. See *On Demand Mach. Corp. v. Ingram Indus., Inc.*, 442 F.3d 1331, 1340 (Fed. Cir. 2006) ("[W]hen the scope of the invention is clearly stated in the specification, and is described as the advantage and distinction of the invention, it is not necessary to disavow explicitly a different scope.... the claims cannot be of broader scope than the invention that is set forth in the specification."). A POSITA would understand based on the specification that a transceiver cannot be waiting to send data if it is powered off. Ex-2013, 60:19-61:5; Ex-1052, 46:5-8.

Petitioners' attempt to use different claim language in the two wherein clauses of claim 25 as a reason to broaden "idle power consumption" to cover a powered-off transceiver is misplaced and contrary to the specification. *Cf.* Reply, 3. *First*, the first wherein clause is irrelevant to interpreting the "idle power consumption" term

in the second wherein clause. During transmissions, the focus is on the “power consumption of the first and second circuitry,” whereas while idling, the “*idle power consumption*” covers the power consumed by the mobile station and *includes the power consumed by the first and second circuitry during idle times*. See Ex-1001, 19:16-20. “The different language selected by patentee” does not, as Petitioners suggest, mean that the transceivers can be off during idle time. *Cf.* Reply, 3. The transceivers must be on to be “waiting to send.” Nowhere does the claim language of specification say or suggest that “idle power consumption” means the transceivers can be powered off. *Second*, although Petitioners contend that the claim language “does not impose any particular requirement on the idle power consumption of the first and second circuitry,” Reply, 3, the specification makes clear that Petitioners’ suggestion is incorrect because all the first and second circuitry cannot be powered off during idle times. See Ex-1001, 2:60-64 (“*The idle time is a time during which the transceiver may be waiting to send data* over the communications channel.”); see also *Vitronics Corp. v. Conceptor, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996) (stating that the specification “is the single best guide to the meaning of a disputed term”).

Petitioners’ use of a single mention of “transmission chains” from the specification does not help their argument as this sentence further supports PO. Petitioners err in assuming that the term “transmission chains” means circuitry

hardware in the sentence “[e]ven if the idling transceivers turn off their transmission chains, some idle power may be consumed...” Ex-1001, 3:5-7; *cf.* Reply, 4-6. *First*, Petitioners’ reading cannot be correct as a matter of grammar or logic because it implies that “idling transceivers” may effectively turn themselves off and somehow still be idling. Rather, a plain reading is that even if transmission is off, there is some idle power consumption because the transceivers are idling. *Second*, a “transmission chain” is not a term of art, and the specification does not suggest that it refers to hardware or otherwise define the term. The patent does not refer to either of items 454 or 460 in Figure 4 as a transmission chain, contrary to Petitioners’ argument. *Cf.* Reply, 5. *Third*, Petitioners did not offer an interpretation of “transmission chains” in their Petition and their expert never offered any opinion about “transmission chains” in his testimony. *Fourth*, PO’s expert confirmed that the term generally has a broad meaning and in the context of the specification “turn off their transmission chains” refers only to the processes of sending data being turned off:

Q. So are you saying that the transmission chains can be powered off while the transceivers are on and consuming idle power?

A. Yes. *A transmission chain is a broad term, and that isn’t limited to hardware. That includes processes. And so the process of sending is what a person of ordinary skill would understand is powered off.* Like, you’re not actively sending. You are not -- but you have to be waiting to send and powered on to be idle.

Ex-1052, 65:15-24; *see also id.*, 57:19-23 (“Q. Okay. So does turning off transmission chains mean that any hardware, any circuitry is being turned off? A. That is not how a POSITA would understand this...”). Thus, turning off transmission chains only means that the transceivers are not transmitting. This passage further supports PO because it *confirms* that idle power consumption refers to times where the transceivers are idling and powered on. *See* Ex-1002, ¶121 (stating “idle power depends on the power drawn by the first and second circuitry while idling”). Even Petitioners’ expert confirmed that when transmission chains are powered off, the mobile station and its circuitry may still be powered on. Ex-2013, 43:12-15 (“Q. You can have transmission chains turned off but circuits and the mobile station would still be powered, right? A. Yes, certainly...”).

The specification’s mention of leakage current does not salvage Petitioners’ argument. Petitioners’ own dictionary definition shows that leakage current is not limited to current in circuitry that is turned off because it more generally means “[c]urrent which flows through unwanted paths of a circuit.” Ex-1051, 415. Other dictionary definitions confirm that ***leakage (i.e., unwanted) current can flow while circuitry is powered on*** during idle times. *See* Ex-2023 (“Undesirable flow of current through or over the surface of insulating material or insulator.”); Ex-2024 (“current flow through the insulation between test points”).

C. The Parties' Expert Testimony Supports Patent Owner's Position

The Parties' expert testimony uniformly confirms that "idle power consumption" does not include times when the transceiver is off. Petitioners' expert admits that a powered off transceiver is not idling because it is not waiting to send:

Q. So if it is fully powered off, ... the transceiver is not waiting to send, right?

*A. If it is fully powered off, I think that would be fair that you would fully power it off at the point that it is no longer wanting to send data, right? So in an idle mode, you would typically have it at least have some power so that it is ready to quickly turn on, right? So, again, you know, I would look at this as **when it is in idle mode, it is just not fully powered off**, but it could be in any of a continuum amount of power usage states.*

Ex-2013, 60:19-61:9.

Yet, Petitioners' expert recognizes that the Board's preliminary construction covers the powered off state. *Id.*, 56:3-7 ("Q. So under the Institution Decision construction, the transceiver can be powered off and still be within the scope of idle power consumption, correct? A. Yeah, I think that would be fair."); *see also id.*, 57:9-13 ("Off just might mean not transmitting. But off might also mean fully powered down or fully powered off. So I think -- I think all of that would be within the scope."). Even Petitioners' expert concedes that idle power consumption means that the circuits cannot be powered off. Ex-1002, ¶86 n.5 ("**Idle power consumption means that the circuits are powered** but have nothing to transmit or receive."); Ex-

2013, 49:20-50:7 (“Q. When you say ‘the circuits are powered,’ you mean that the circuits are powered on, right? *A. What I mean here is that they are not powered off.*”). Since powered-off circuitry is not idling, “idle power consumption” cannot include times where the transceiver is off. Thus, the Board erred in its preliminary construction because it stated that “idle power consumption” includes circuitry that is powered off.

III. THE CHALLENGED CLAIMS OF THE '120 PATENT ARE NOT UNPATENTABLE UNDER 35 U.S.C. § 103

A. Ground 1: Claims 25, 27, and 28 Would Not Have Been Obvious Over Li in View of Siam.

- i. Petitioners fail to demonstrate that a POSITA would have been motivated to combine Li and Siam.*

The evidence shows that there is no motivation to combine Li and Siam for the purposes of selecting a transmission mode in accordance with a control signal based in part on idle power consumption. Petitioners state that “Li does not disclose when to make such a mode switch to optimize *total* power consumption (both when transmitting and not transmitting).” Reply, 9. Petitioners further state that “Siam presents a protocol for optimizing power while transmitting...” *Id.* But neither Li nor Siam considers power consumption when not transmitting, nor is there any suggestion to consider idle power consumption in a control signal for purposes of mode selection. Thus, whether a “POSITA would have been motivated to combine Li-Siam to optimize total power consumption,” Reply, 9, is insufficient and

irrelevant because the Li-Siam combination would not arrive at the claimed invention of a control signal based in part on idle power consumption. *See Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1073 (Fed. Cir. 2015) (“[O]bviousness concerns whether a skilled artisan not only *could have made* but *would have been motivated to make* the combinations or modifications of prior art to arrive at the claimed invention.”) (emphasis in original).

Petitioners have no evidence to show that the purported motivation of “selecting an optimal data communication mode” would involve considering idle power consumption. Li purports to solve the power consumption problem without mention of power consumption when not transmitting, Ex-1005, [0019], and Siam also fails to consider idle power consumption. “[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references [to reach the claimed invention].” *ActiveVideo Networks, Inc. v. Verizon Commc’ns, Inc.*, 694 F.3d 1312, 1328 (Fed. Cir. 2012) (quoting *Innogenetics, N.V. v. Abbott Labs*, 512 F.3d 1363, 1373 (Fed. Cir. 2008)). Indeed, Li does not even suggest monitoring idle power consumption at all. No POSITA would assume that Li is purporting to solve a problem it does not describe, Ex-2022, ¶83, and no POSITA would have combined Li and Siam to create a system that uses a control signal based in part on the idle power consumption of the mobile station, *id.* ¶84.

By contrast, the '120 Patent solves the power consumption problem by considering idle power consumption in addition to power consumption when transmitting in determining mode selection. Unlike Petitioners' prior art, the '120 Patent expressly states that the "energy-optimized rate may be based, at least in part, on power consumption of circuitry [and] may also ... be based, at least in part, on a power consumption of the transceiver during an idle time." Ex-1001, 2:51-60. Since neither Li nor Siam suggest considering idle power consumption as part of the way to address the power consumption problem, there is no reason or motivation to combine Li with Siam to address power consumption when not transmitting.

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

Petitioners' Reply has no response to Li and Siam's failure to disclose or suggest 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.

Petitioners overstate the teachings of Li by claiming that "Li recognizes the problem of circuit power consumption while the transceiver is idle" and "addresses it with a signal that switches transmission modes." *Cf.* Reply, 12. Even if that were true (it is not), it would be insufficient to teach or suggest a control signal based, at least in part, on an idle power consumption of the mobile station. There is simply no evidence or suggestion that the "Li-Siam combination teaches considering circuit

power while idle in selecting a transmission mode.” *Cf. id.* There is no suggestion that idle power consumption is part of the solution proposed by Li, and there is no reason for a POSITA to consider idle power consumption as part of Li’s solution. Ex-2022, ¶87. It is un rebutted that Li does not disclose how “idle mode” could be used for power consumption, how “idle mode” could be relevant to mode selection, or how “idle mode” might be considered with respect to a control signal received by the mobile station. *Id.*; Ex-2013, 69:11-19 (stating that one mention is “the extent of Li’s consideration of idle mode”).

Li’s single reference to “idle mode” offers no teaching or suggestion about incorporating the possible use of the power consumed while idling. Ex-1005, [0018]. There is certainly no indication based on this passing comment that “idle mode” is in any way involved in the mode selection process. Petitioners’ expert agrees that Li does not identify inputs or variables used in mode selection or say anything about using power consumption to determine mode selection. Ex-2013, 68:14-69:8; Ex-1005, [0024]. Li does not provide any criteria for determining mode selection, and certainly does not consider idle power consumption, in the receiver control signal or determining mode selection. Ex-1005, [0024]-[0025]; Ex-2022, ¶88. It is undisputed that Siam does not mention or consider “idle power” or idle states at all. Ex-2013, 64:11-14. Even if there would have been a motivation to combine Li and Siam, there

would have been no indication to a POSITA that combining them could or would introduce consideration of idle power consumption. Ex-2022, ¶90.

Petitioners' only remaining argument is their expert's conclusory assertion that "a POSITA 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 ... circuit power consumed while the mobile station is idle and not receiving or transmitting." Ex-1002, ¶123. But that is insufficient because allegations of obviousness "cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

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

i. Petitioners fail to demonstrate that a POSITA would have been motivated to combine Li-Siam with Cui-2003.

A POSITA would not have been motivated to combine Li, Siam, and Cui to arrive at the claimed invention. Ex-2022, ¶93.

Petitioners misquote the prior art by contending that "Cui-2003 further improves Li-Siam's system by expanding Siam's total energy ... to also include the power consumed when the system is 'working in a sleep mode....'" Reply, 14 (quoting Ex-1007, 2806). Neither Cui-2003 nor the Petition uses the word

“working.” Petitioners’ contention that “the circuitry is *working*” in Cui’s sleep mode is simply incorrect. *Cf. id.* Cui-2003 states that *sleep mode is “where all the circuits in the signal path are shut down* for energy saving.” Ex. 1007, 2806. No POSITA would draw Petitioners’ erroneous conclusion that the circuitry is active in sleep mode when Cui-2003 expressly states the opposite. *See id.*; Ex-2022, ¶111. Indeed, a plain reading of the misquoted sentence shows that Cui-2003 repeatedly uses the word “work” to mean operate, not that circuitry is actively doing anything as Petitioners’ misleadingly suggest: “We assume 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....” Ex-1007, 2806. Petitioners’ misreading of Cui-2003 only shows that Cui-2003’s sleep mode is completely different from, and does not disclose or suggest, idling. Ex-2022, ¶111.

Acknowledging that the Petition failed to explain why a POSITA would have been motivated to combine the references because Cui-2003 sets the power consumed in sleep mode to zero, Petitioners argue that “Cui-2003’s analytical framework could accommodate” a non-zero power consumption in sleep mode. *Cf. Reply*, 15. But this is insufficient because a POSITA would not have considered the power expended in sleep mode to be relevant to transmission mode selection since Cui-2003 sets the power consumed in sleep mode to zero. Ex-2022, ¶98. The

possibility of non-zero power consumption in sleep mode is simply speculation since a POSITA reading Cui-2003 would understand that sleep mode has no impact at all on selecting an efficient transmission mode. *Id.*; see *Los Angeles Biomedical Res. Inst. v. Eli Lilly & Co.*, 849 F.3d 1049, 1066 (Fed. Cir. 2017) (“[L]egal determinations of obviousness, as with such determinations generally, should be based on evidence rather than on mere speculation or conjecture.” (quoting *Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1290 (Fed. Cir. 2006))).

Petitioners' argument further fails because they do not articulate how a POSITA would have combined Li-Siam with Cui-2003's energy equations. See *PersonalWeb Techs., LLC v. Apple, Inc.*, 848 F.3d 987, 994 (Fed. Cir. 2017) (“[A] clear, evidence-supported account of the contemplated workings of the combination is a prerequisite to adequately explaining and supporting a conclusion that a relevant skilled artisan would have been motivated to make the combination.”). As in *PersonalWeb*, Petitioners failed to explain how Li-Siam's system would be combined with a modified version of Cui-2003's sleep mode having a non-zero power consumption. Ex. 2022, ¶99. Petitioners' conclusory assertion that a POSITA “would have viewed Cui-2003's energy equations as a way to improve upon Siam's” fails to explain how the proposed combination would have worked. *Cf.* Reply, 15; see also *TQ Delta, LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1361 (Fed. Cir. 2019).

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

Cui-2003's sleep mode is completely different from the claimed “idle power consumption” because in sleep mode the circuit are shut down. Cui-2003 describes “sleep mode” as where “all the circuits in the signal path *are shut down* for energy saving,” Ex-1007, 2806, not like the “claimed ‘idle’ mode” where circuits are “powered on but not transmitting.” Pet., 46. In fact, Cui-2003 sets the power consumption for sleep mode to zero because there is effectively no power consumed. *See id.* Petitioners' expert agrees that given the conditions recited in Cui-2003, “it is reasonable to in certain situations set it to zero.” Ex-2013, 93:18-94:7.

Faced with these devastating facts, Petitioners again twist Cui-2003's disclosure to claim that the mobile device is “*work[ing]* in sleep mode.” Cf. Reply, 16. As stated above, Cui-2003 repeatedly uses the word “work” to mean operate, not to describe the state of the circuitry or to change the fact that the circuits are shut down in sleep mode. Ex-1007, 2806. Cui-2003's “multi-mode operation [] provid[es] a significant saving of energy when the sleep mode is deployed,” confirming that the power consumed in Cui-2003's sleep mode is effectively zero, unlike idling where there is a non-negligible and potentially significant energy consumption. Ex-2013, 87:3-5; Ex-2022, ¶104. A POSITA would recognize that there is no need for a control signal to be based at least in part on this zero-power

consumption state, confirming that Cui-2003's sleep mode is insufficient to teach or suggest the "idle power consumption" limitation. Ex-2022, ¶110.

Petitioners try to conflate these two distinct modes by stating that "power consumption of Cui-2003's sleep mode may be lower than that of the '120 Patent's idle mode." *Cf.* Reply, 17. But the difference between sleep and idle is one of kind, not of degree because Cui-2003's sleep mode is a zero-power consumption state, not just lower power consumption.

Petitioners are also incorrect in contending that "Cui-2003's sleep mode is a state in which it is 'waiting to send.'" *Cf.* Reply, 17. Petitioners' expert confirms that switching from sleep mode to active mode requires powering up the circuits that were shut down. Ex-2013, 95:9-14. This is wholly unlike idling, where the circuits are powered on, *cf.* Pet., 46, or at least not powered off as Petitioners' expert concedes, Ex-1002, ¶96. Petitioners' and PO's experts agree that a transceiver cannot be waiting to send data if it is powered off or shut down like in Cui-2003's sleep mode. *See* Ex-2013, 60:19-61:5; Ex-1052, 46:5-8.

Thus, consistent with the proper interpretation of "idle power consumption" discussed *supra*, a POSITA would not understand a sleep mode "where all the circuits in the signal path are shut down" to suggest the claimed "idle power." Ex-2022, ¶104.

C. Grounds 3 and 4: Claim 26 Would Not Have Been Obvious.

Petitioners fail to rectify the above-identified deficiencies with respect to claim 25 in their arguments with respect to Grounds 3 and 4.

D. Ground 5: Claim 29 Would Not Have Been Obvious Over Li-Siam in View of Tirola.

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

Faced with a fundamental discrepancy, Petitioners have changed their motivation to combine argument but are unable to salvage Ground 5.

Petitioners originally argued 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 would help indicate instances where a SIMO mode is not favorable. Pet., 61-62. But Li-Siam and Tirola contain divergent views on the use of MIMO technology in uplink communications, Ex-2022, ¶¶118-119, and Petitioners failed to show that a POSITA would have known how to account for these differences between the references or to otherwise address problems that would arise from the proposed combination. *See id.* ¶¶121-23; *see also Adidas AG v. Nike, Inc.*, 963 F.3d 1355, 1359 (Fed. Cir. 2020) (“Fundamental differences between the references are central to this motivation to combine inquiry.”).

Petitioners now contend that “Tirola shows that the number of users has *any* effect (positive or negative) on the selection of SIMO or MIMO mode under *any* conditions is what would have motivated a POSITA to consider the number of users in determining whether to switch between SIMO and MIMO.” Reply, 21 (emphasis in original). But Petitioners’ new argument defeats their position. According to Tirola, the number of users has no effect on SIMO/MIMO selection because no crossover point is shown between SIMO and MIMO in Tirola. Ex-1008, 659-61. Petitioners do not dispute that Figure 4 does not disclose or suggest a crossover point.

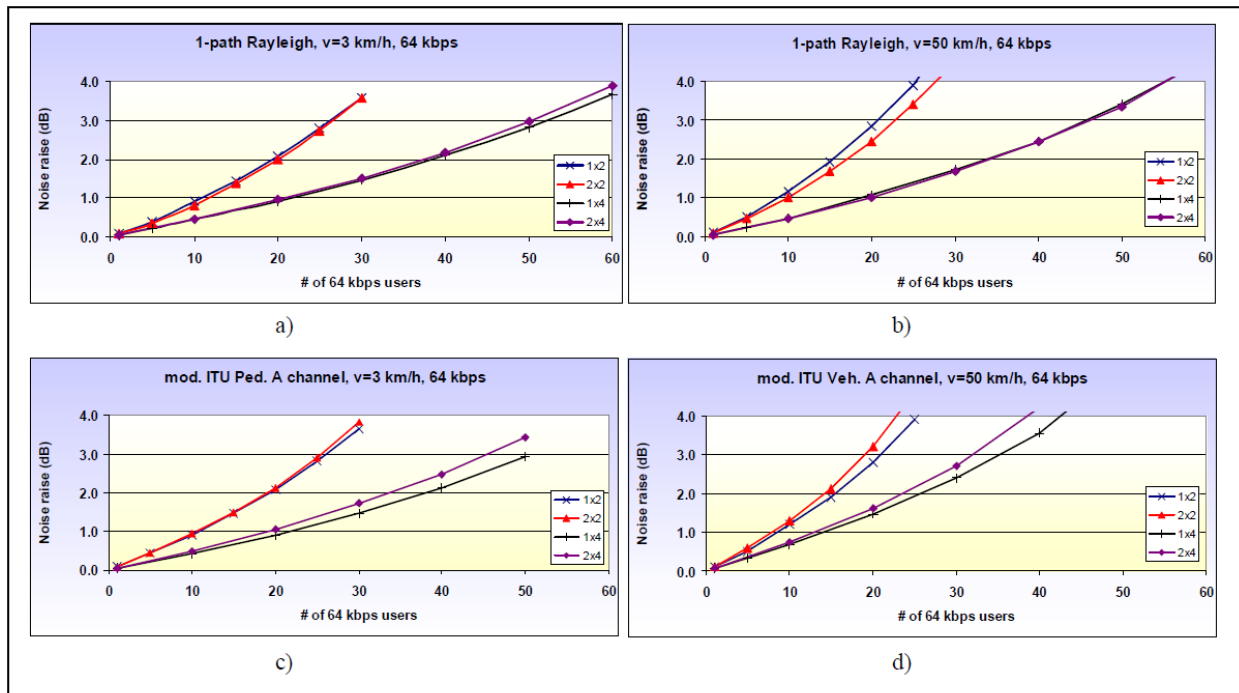


Figure 4. UL noise rise, SIMO and MIMO, 64 kb/s.

This fatal fact is apparently why Petitioners’ expert generated a “modified figure” to create a crossover point that is neither found in nor suggested by Tirola. Ex-1002, ¶¶179-80 (stating that once “these curves are shifted, there could be a

crossover point”). Petitioners’ expert also states that a “POSITA would have understood that as the noise penalty of a SIMO mode grows with the number of users, it may be advantageous at some point to switch to MIMO operation.” Ex-1002, ¶166. But, again, that it not what Tirola shows, because Figure 4 plainly shows that number of users has a consistent effect on noise rise for both SIMO and MIMO mode. Ex-1008, 659-61.

Petitioners’ arguments fail because they do not articulate how a POSITA would have incorporated a control signal based in part on the number of users of the communications system in the Li-Siam system. Ex-2022, ¶123. Petitioners failed to explain in their Petition why a POSITA would have been motivated to combine Tirola’s teachings about the number of users into the Li-Siam system. *See Trivascular, Inc. v. Samuels*, 812 F.3d 1056, 1066 (Fed. Cir. 2016) (“Although the *KSR* test is flexible, the Board ‘must still be careful not to allow hindsight reconstruction of references ... without any explanation as to *how* or *why* the references would be combined to produce the claimed invention’” (quoting *Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1368 (Fed. Cir. 2012))). As explained further below, it is improper for Petitioners’ expert to use the ’120 Patent as a roadmap to generate his “modified figure” to arrive at the claimed invention.

- 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, individually or in combination, disclose a "control signal based, at least in part, on the number of users of the communication system." Ex-2022, ¶¶124-25.

Petitioners' argument seeks to add "consideration of the noise rise as a function of the number of users" into "Siam's energy equation." Reply, 22. In so doing, Petitioners' expert states that Tirola's "curves would need to shift upwards to display total power." Ex-1002, ¶179. And, by "shifting Tirola's 2x2 (MIMO) curve up by a larger amount ... than the 1x2 (SIMO) curve," Petitioners' expert opines that "there would be some crossover point." Reply, 23 (quoting Ex-1002, ¶180).

But none of the references teaches or suggests a crossover point based on the number of users, Ex-2022, ¶127, and unlike the '120 Patent, Ex-1001, 4:62-64, none of the references use the term "crossover point" or recognize such a concept. Petitioners' attempt to recreate the claimed invention through an expert's "modified figure," divorced from the teachings of the prior art, is improper. "[C]rediting such testimony risks allowing the challenger to use the challenged patent as a roadmap to reconstruct the claimed invention using disparate elements from the prior art—i.e., the impermissible ex post reasoning and hindsight bias that *KSR* warned against."

TQ Delta, 942 F.3d at 1361; *see also In re Cyclobenzaprine Hydrochloride Extended-Release Capsule Patent Litig.*, 676 F.3d 1063, 1073 (Fed. Cir. 2012) (“In relying on [expert] testimony, the district court merely retraced the inventor’s steps. This hindsight analysis is inappropriate because obviousness must be assessed at the time the invention was made.”). Petitioners have failed to show that the prior art discloses a “control signal based at least in part on the number of users of the communications system.” Ex-2022, ¶127.

IV. CONCLUSION

For the foregoing reasons, the Board should find that Petitioners have failed to show that any Challenged Claims are unpatentable under the instituted Grounds.

Dated: July 21, 2025

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 5,558 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: July 21, 2025

Respectfully submitted,

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. § 42.6(e), the undersigned certifies that Patent Owner's Sur-Reply and Exhibits 2023-2024 were served on July 21, 2025, by filing them through the 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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